Experimental investigation of a six inch diameter, four inch span cross-flow fan

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EXPERIMENTAL INVESTIGATION OF A SIX INCH DIAMETER, FOUR INCH SPAN CROSS-FLOW FAN

by

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June 2008

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Investigations into the use of a cross-flow fan as a potential source of propulsion and lift have arisen due to the cross-flow fan's geometry, light weight and safety by shielding from bystanders. The application of a cross-flow fan as the propulsion source for a fan-wing vertical takeoff and landing vehicle has drawn attention in recent years. Previous investigations have demonstrated the performance characteristics of multiple cross-flow fan configurations.

During this experiment a cross-flow fan with 30 blades, a 6 inch diameter and a 4 inch span was tested. The performance and stall characteristics were determined and plotted along constant speed and constant throttle setting lines. Comparison of the tested cross-flow fan was made against two previously tested cross-flow fans with similar design and 1.5 inch and 6 inch span lengths. Performance parameters of the three cross flow fans were compared and plotted for constant speed curves. The results allowed for general trends to be determined and scaling laws to be deduced.

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EXPERIMENTAL INVESTIGATION OF A SIX INCH DIAMETER, FOUR INCH SPAN CROSS-FLOW FAN

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I. INTRODUCTION

A. OVERVIEW

The need for a small personal air vehicle to offset the reliance on the automobile for short to intermediate passenger transport has fueled the research in lift and propulsion devices for personal vertical take-off and landing (VTOL) vehicles. While helicopters offer the best hovering efficiencies, arguments have been made that there are significant handling and safety disadvantages which make them less acceptable to the general public. Lift-fan powered fixed wing aircrafts trade hovering efficiency for the benefit of better cruise flight efficiency. Additionally, ducted lift fans have the advantage of shielding users and bystanders from rotating blades and high noise levels [1].

The advantage of ducted fans has been recognized by Moller International of Davis California [2] who is currently in the process of certifying their Skycar, a VTOL commuter aircraft that uses four ducted fans with a thrust deflection vane system for lift and propulsion. During cruise flight of the Moller Skycar, it is estimated approximately two thirds of the required lift is provided by the lift fans. While the Skycar has demonstrated reasonably good capability and efficiency, it does not have the benefits as that of a conventional fixed-wing aircraft with good cruise flight efficiency and wider user acceptance [1].

The cross-flow fan (CFF) as a lifting and propulsion device retains the advantages of both a fixed-wing aircraft and a ducted lift fan. There is no upper limit to the rotor length-to-diameter ratio of a CFF allowing for the device to be installed along the length of the wing or lifting surface. Also, the CFF discharge vector can be easily rotated about the fan axis since the fan has no angular requirements, allowing for vertical take-off and landing [1].

Several concepts have been proposed for utilizing cross-flow fans in aircrafts, with a successful demonstration by Fanwing LTD [3] to use a cross-flow fan in the leading edge of the wing section of a Short Take-off and Landing (STOL) flying model

aircraft. More recently Kummar and Dang [4] applied a CFF to the trailing edge of a modified Gottingen 570 airfoil resulting in a high-lift propulsive wing.

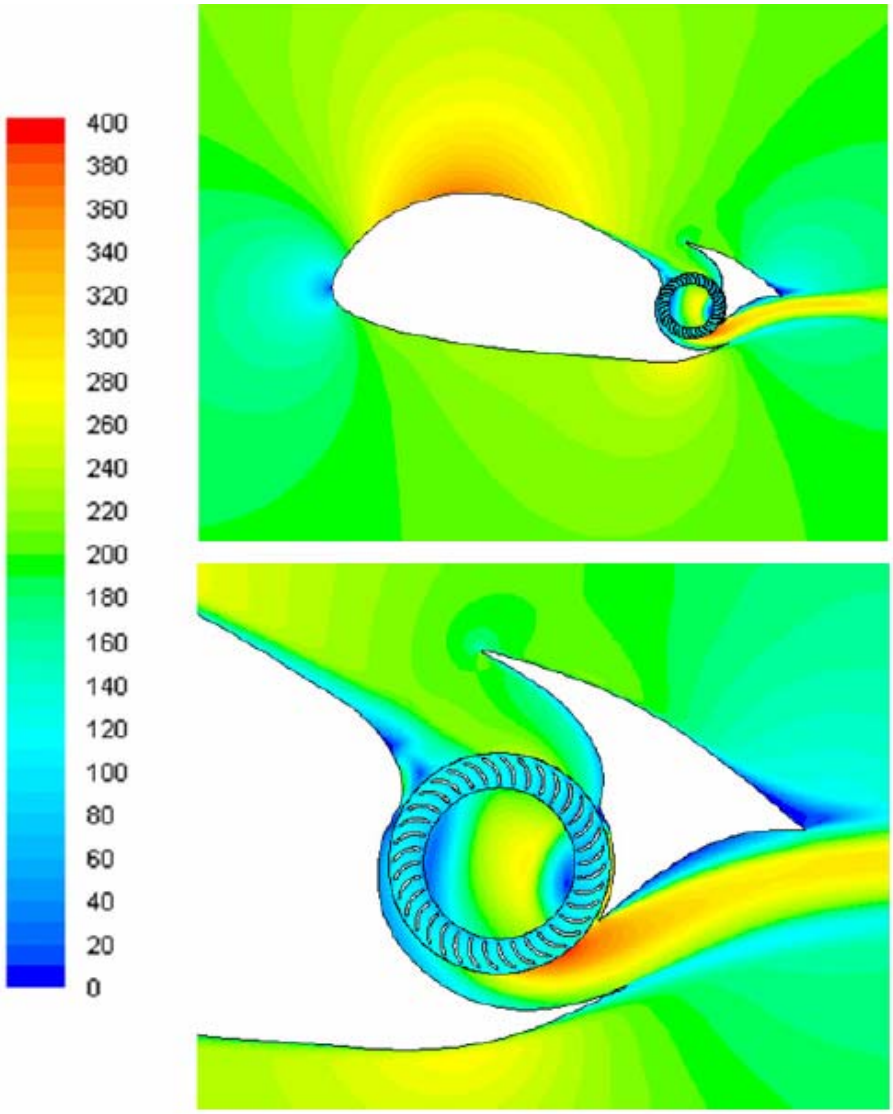

Figure 1. Velocity magnitude contours for modified Gottingen 570 airfoil. From [4]

B. CROSS-FLOW FAN BACKGROUND

The Cross-Flow Fan utilizes an impeller with forward swept blades placed in a housing that contains vortex walls. Unlike radial machines, the main flow traverses across the impeller, passing the blades twice. Cross-flow fans are used in commercial and industrial applications to primarily move air in a linear fashion producing a long, thin

airstream. Applications range from computer cooling fans, to “air curtains” which maintain heating and cooling boundaries often seen in open bay freezers and refrigerators in supermarkets.

The application of cross-flow fans for aircraft implementation was first seriously explored by Vought Systems Division of the LTV Aerospace Corporation in the 1970s in their Multi-Bypass Ratio Propulsion System Development program for a Navy Contract to explore new concepts for the development of subsonic transport aircraft [5]. Cross-flow fans with a 12 inch diameter and a 1.5 inch and 12 inch span were tested with various rotor arrangements and housing geometries, resulting in 46 configurations. The different configurations consisted of varying blade angles and number of blades as well as different housings, pressure cavity configurations and exit ducts. One of the optimal configurations found by VSD was assembly #6, which consisted of a 30 blade rotor and a 4.6 in exit duct height, with a typical setup as shown in Figure 2.

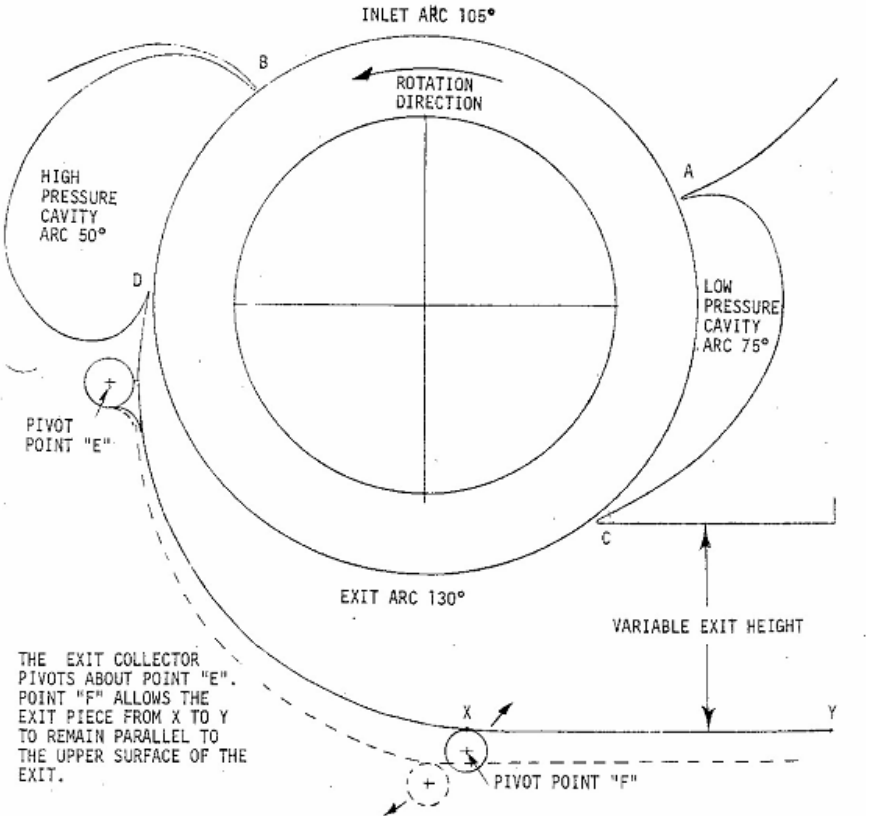

Figure 2. VSD Multi-Bypass Ratio Propulsion System Fan Housing Setup. From [5]

After the initial research on CFFs conducted by VSD, little further research was conducted on CFFs for several decades. In 2000 researchers at the Naval Postgraduate School's Turbopropulsion Laboratory (TPL) began to look at CFFs for the application of aircraft lift and propulsion when Gosset [6] proposed to use CFFs to augment the thrust needed for VTOL in his feasibility study for a single seat VTOL. The CFF configuration evaluated by Gosset was the #6 assembly from the VSD report.

In 2003 further research of the CFF was conducted by Seaton and Cheng [7], [8] with a series of test conducted on a 12 inch diameter, 1.5 inch length fan similar to the VSD assembly #6. Initial testing was used to validate VSD data and exhaust throttling was added to vary mass flow rate at rotational speeds of up to 6000 RPM. Numerical modeling using FLO++ was also incorporated however the numerical results did not follow experimental trends. Later experimental research was conducted on a 6 inch diameter, 1.5 inch span CFF and a 6 inch diameter, 6 inch span [1], [9] with speeds up to 8000 RPM and 4500 RPM respectively. The 6 inch diameter, 6 inch span CFF experienced structural failure at under 5000 RPM. Finally numerical modeling was conducted by Yu [10] on the 12 inch diameter, 1.5 inch span using the computation fluid dynamics package CFX provided by ANSYS, showing good correlation between experimental and numerical results.

The rotors tested in the above experiments were assembled from a machined disc with 30 identical rotor blades and a retaining ring. The blades were pinned in place using dowels and secured with Hysol epoxy E-120 HP [1]. The housing consisted of an inlet, high pressure cavity, low pressure cavity and outlet as shown in Figure 3.

The current rotor retained the same base configurations as the previous experiments with a 6 inch diameter and a 4 inch span impeller. The retaining discs were modified with a diameter larger than the rotor diameter, allowing for the retaining discs to be machined for a press fit of the blades into the hub and end plate as shown in Figure 4. The housing had to be notched on the ends so that the clearance could be maintained as those used by Schreiber [9]. The experimental tests focused on a speed range between 3000 and 6000 RPM, allowing for comparison between the current rotor and the previous experimental data from the 6 inch diameter, 1.5 inch and 6 inch span CFFs.

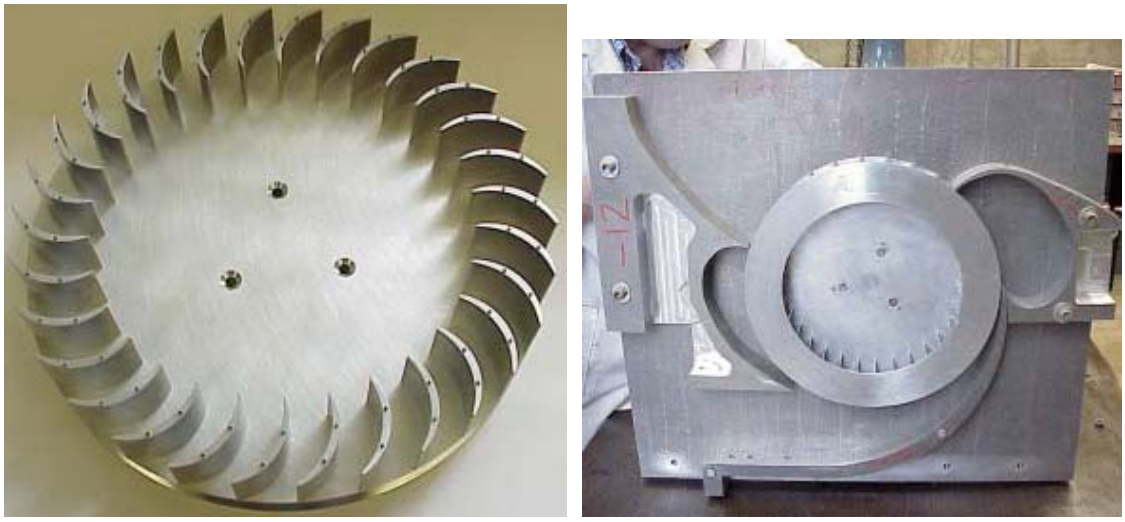

Figure 3. CFF assembly (a), Partially assembled 30 bladed rotor and (b), Partially assembled rotor housing. From [7]

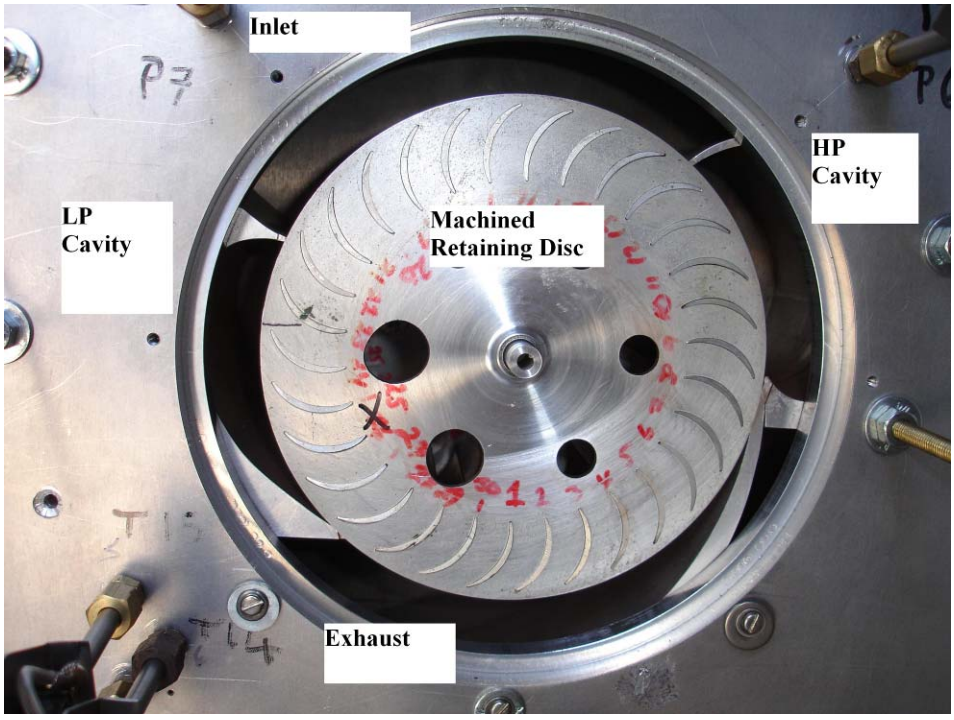

Figure 4. Partially assembled 6 inch diameter, 4 inch span cross-flow fan and housing

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II. EXPERIMENT SETUP

A. DESCRIPTION OF EXPERIMENTAL APPARATUS

1. Turbine Test Rig

The drive shaft of the Cross-Flow Fan Test Assembly (CFTA) was powered by the previously existing Turbine Test Rig (TTR) at the Turbo Propulsion Laboratory at the Naval Postgraduate School. The turbine in the TTR was driven by an air supply system from an Allis-Chalmers 12-stage axial compressor which was driven by a 1,250 horsepower electric motor. The compressor was capable of producing up to 10,000 cubic feet of air per minute at 30 psig which was cooled prior to being supplied to the test cell plenum chamber.

Air from the test cell plenum chamber was fed into the TTR turbine as shown below in Figure 1. A pressurized oil mist system provided lubrication for the turbine bearing housing. A data acquisition system on the TTR provided a control station with vibration monitoring, bearing temperatures and shaft speed from a once per revolution measurement system.

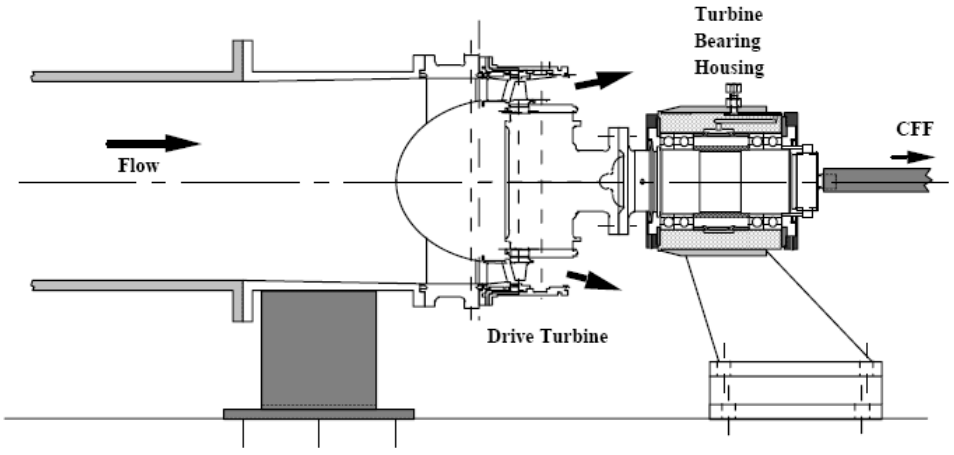

Figure 5. Schematic of Turbine Test Rig. From [8]

2. Cross-Flow Fan Test Assembly (CFTA)

The Cross-Flow Fan Test Assembly (CFTA) tested was similar to other CFTAs used at the NPS TPL for previous CFF tests [1], [7], [9], [10] derived from the VSD assembly #6. The CFTA consisted of a 6 in diameter, 4 in span, 30 blade rotor, fan housing (inlet, exhaust, high pressure and low pressure cavity), bearing housing and drive shaft connected to the TTR. The inlet was fitted with a bellmouth used to measure the mass flow rate, similar to previous tests [10]. An exhaust duct with a butterfly valve was connected to the exit of the fan housing to allow for throttling studies.

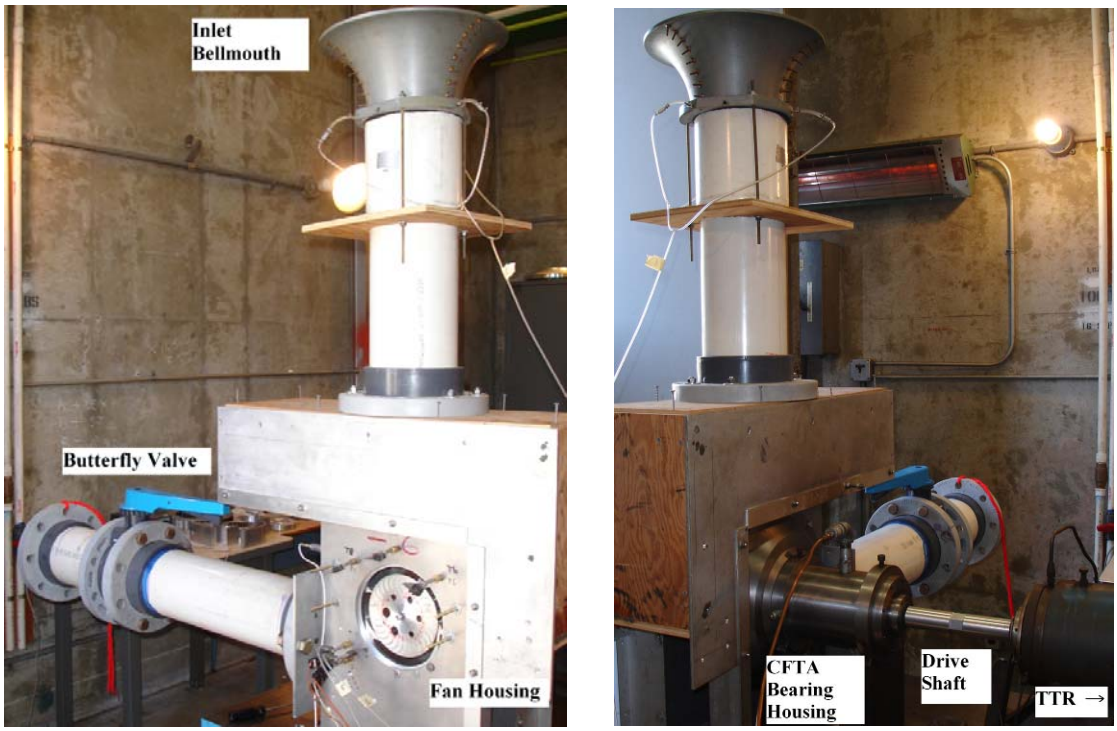

Figure 6. Cross-flow fan test assembly, (a) Front of CFTA with face plate removed from fan housing, (b) Back of CFTA, connecting to TTR

3. Control Station

A control station next to a window looking into the test cell was used to control and monitor the TTR and CFTA during an experiment. The rotational speed of the TTR was controlled by a valve throttling system that controlled the flow into the turbine or out of the discharge line. The TTR speed was monitored by a one-per-revolution system.

During a test, the vibrations and bearing temperatures were monitored and recorded in a log book. The throttle setting of the CFTA was manually controlled by adjusting the downstream butterfly valve.

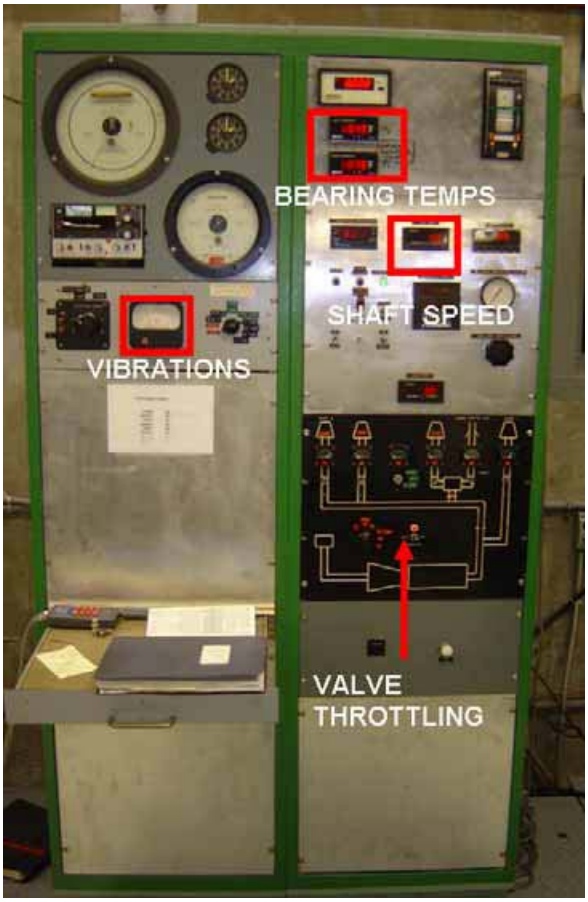

Figure 7. Control Station. From [9]

B. DATA ACQUISITION SYSTEM

1. Instrumentation

The flow properties were measured using United Sensor Devices model USD-C-161 3 mm (1/8-inch) combination thermocouple/pressure probes and static pressure taps with the locations shown in Figure 8. The air tubes from the pressure probes went to a Scanivalve digital sensing array (DSA), which converted mechanical pressures into analog electronic signals. The pressure data was then converted from an analog signal

into a digital signal by the DSA (IP address 172.120.20.254) which was acquired by the computer via an internet cable. Similarly, the thermocouple sensor wires were routed to a multiplexer and were recorded by the HP E1326B Multimeter Adapter within a VXI mainframe, which was connected to the computer. The shaft speed was measured with a counter-totalizer which converted electric pulses from the once-per-revolution sensor on the drive turbine into a readout of shaft speed. The Scanivalve port, location, data label and measurement type for the pressure measurements are shown in Table 1. The multiplexer channel, location and data label for the thermocouple is shown in Table 2.

It was determined in previous experiments [10] that the variation of total pressures between the three inlet combo probes (10, 12 and 2 o'clock positions) was not significant; therefore, they were averaged by introducing "tees" to combine them before connected to the pressure transducer array. The total temperature measurements at these positions were averaged during data reduction. The same conclusion was made for the three static pressure probes at the throat of the bell-mouth and to the two exhaust duct static pressure taps.

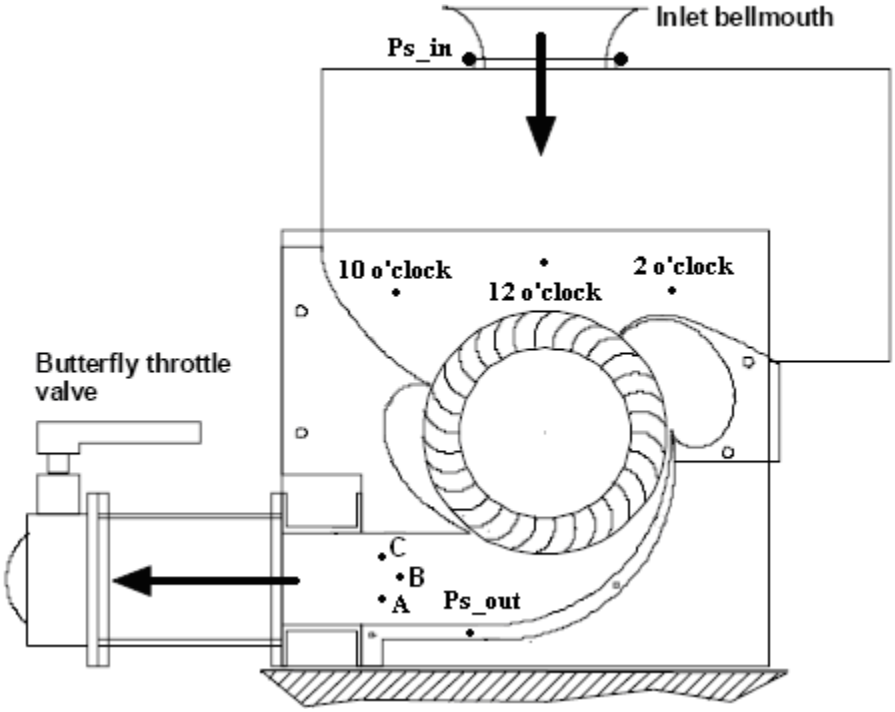

Figure 8. Location of Combo Probes and Static Pressure Taps

Port #	Probe	Nomenclature	Type
7	A	Pt_A	Total Pressure
6	B	Pt_B	Total Pressure
5	C	Pt_C	Total Pressure
2	10 o'clock	Pt_in	Total Pressure
	12 o'clock		
	2 o'clock		
1		Ps_in	Static Pressure
3		Ps_out	Static Pressure
8		P_cell	Static Pressure

Table 1. Pressure Measurements

Multiplexer Channel	Probe	Nomenclature	
13	A	Tt_A	
14	B	Tt_B	
15	C	Tt_C	
8	10 o'clock	Tt_10	Tt_in
9	12 o'clock	Tt_12	
6	2 o'clock	Tt_2	

Table 2. Temperature Measurements

2. Software

The pressure, temperature and rotation speed measurements were acquired using the software program Agilent VEE, a Windows-based data acquisition program. The graphical user interface (GUI) developed for a previous CFF experiment performed by Yu [10] was used as a baseline to develop the GUI "Ulvin_CFF_DAQ."

During an experiment temperature, pressure and rotational speed were recorded by the program, from which numerous parameters of interest were calculated. Some of these parameters were displayed on a real-time GUI to be monitored during a test point as shown in Figure 9. All of the parameters of interest could be written to an output file. When a steady state point was reached for a desired test point the user could record the raw data (temperature, pressure and speed) as well as the calculated parameters to a tab

delimited text file using the button “Write Title” to write heading titles for the first test point and “Write Data” to write the raw and calculated data.

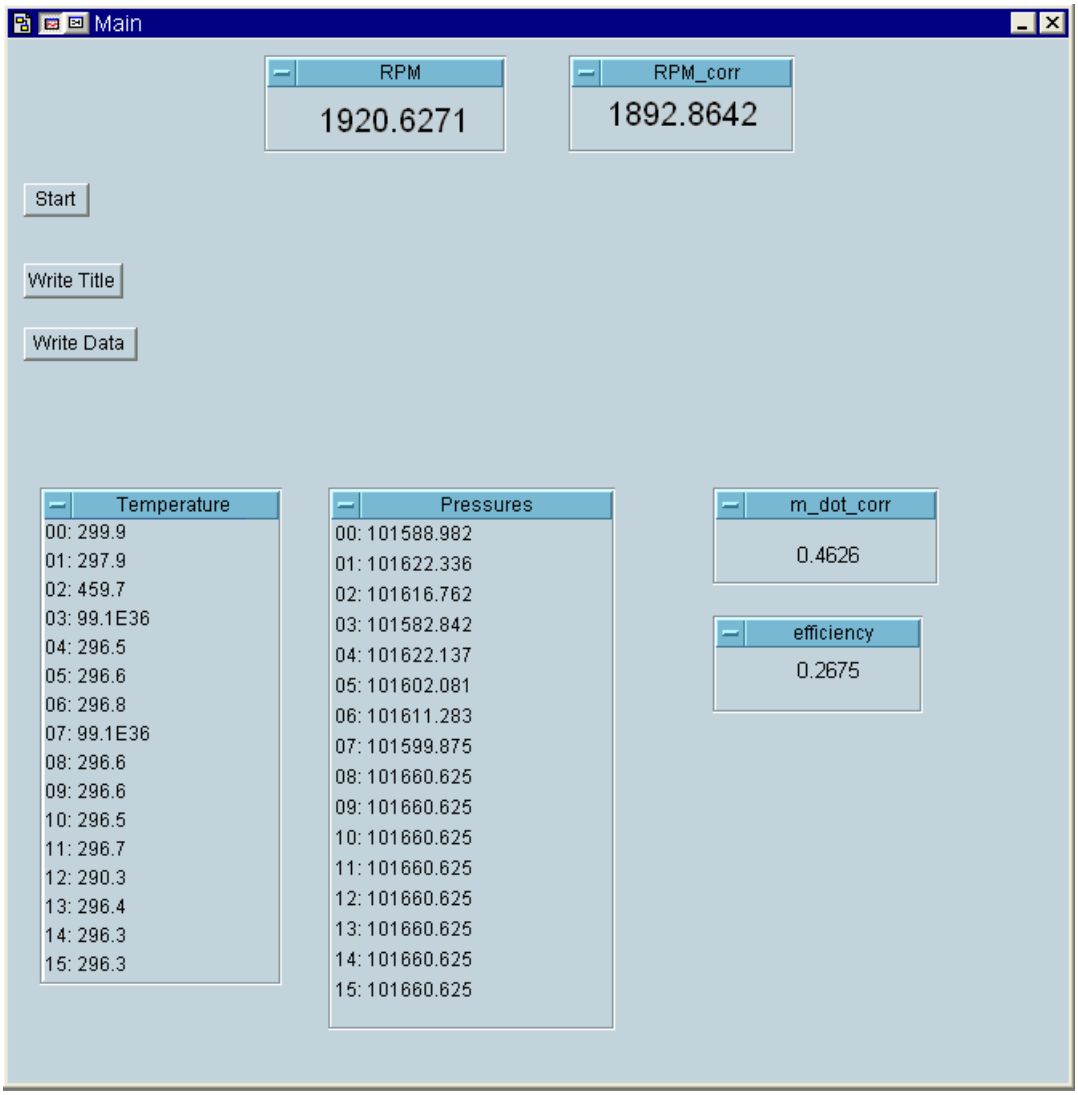

Figure 9. Ulvin_CFF_DAQ Graphical User Interface

3. Data Reduction

In order to perform analysis on the performance of the cross-flow fan at different speeds and throttling settings the mass flow rate, pressure ratio, temperature ratio, efficiency, power and thrust needed to be calculated from the total pressure, total temperature, static pressure and static temperature measurements.

The mass flow rate for both the inlet and the outlet zones (A, B and C) were calculated using the non-dimensional velocity X, defined as a fraction of the velocity referred to the stagnation velocity.

$$X_i = \frac{v_i}{v_{t,i}} \text{ where } v_{t,i} = \sqrt{2c_p T_{t,i}} \text{ and } X_i^2 = \frac{\frac{\gamma-1}{2}M^2}{1+\frac{\gamma-1}{2}M^2}$$

Where c_p is the specific heat at constant pressure, γ is the ratio of specific heat and M is the Mach number. This leads to the following relationships for compressible flow for temperature, pressure and density:

$$\frac{T_i}{T_{t,i}} = 1 - X_i^2 \;; \quad \frac{P_i}{P_{t,i}} = \left(1 - X_i^2\right)^{\frac{\gamma}{\gamma-1}} \;; \quad \frac{\rho_i}{\rho_{t,i}} = \left(1 - X_i^2\right)^{\frac{1}{\gamma-1}} \qquad (1)$$

Manipulating these relationships gives:

$$v_i = X_i\sqrt{2c_p T_{t,i}} \qquad (2)$$

$$\rho_i = \frac{P_{t,i}}{RT_{t,i}}\left(1 - X_i^2\right)^{\frac{1}{\gamma-1}} \qquad (3)$$

$$X_i = \sqrt{1-\left(\frac{P}{P_{t,i}}\right)^{\frac{\gamma-1}{\gamma}}} \qquad (4)$$

Where i indicates each zone (inlet, A, B or C), R=287 $m^2/(s^2*K)$, c_p=1004.4 J/(kg*K), γ=1.402, $P_{t,i}$ is total pressure (Pt_in, Pt_A, Pt_B, Pt_C), $T_{t,i}$ is total temperature (Tt_in, Tt_A, Tt_B, Tt_C) measured from the combo probes and P_i is the static pressure (Ps_in, Ps_out) as described above in Table 1 and Table 2.

The mass flow rate is then calculated from:

$$\dot{m}_i = \rho_i v_i A_i \;\rightarrow\; (5)$$

Substituting (2) and (3) into (5) give:

$$\dot{m}_i = \frac{P_{t,i}}{RT_{t,i}}\left(1 - X_i^{\,2}\right)^{\frac{1}{\gamma-1}} X_i \sqrt{2c_p T_{t,i}}\, A_i \qquad (6)$$

A_i is the area of each zone. For the inlet it is calculated as $A_{inlet}=\pi*D^2/4$ where D_{inlet} = 6.25 inches, giving A_{inlet} = 0.019793 m^2 . The areas for the three zones at the exit were calculated from the height measurements shown in Figure 10 and a length measurement of 101.5 mm (4 inches), giving the resulting areas shown in Table 3.

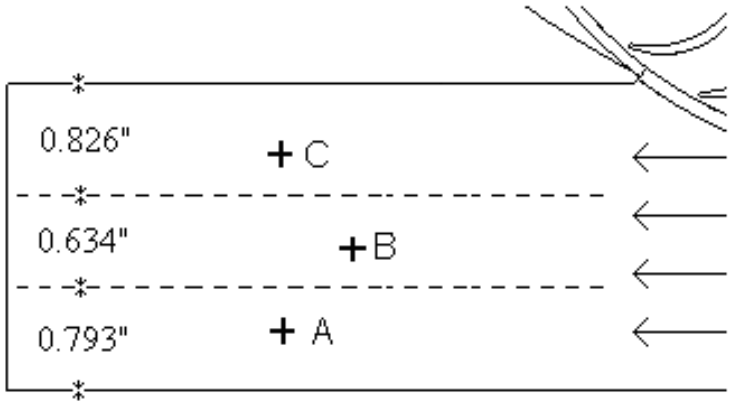

Figure 10. Measured Heights for Zones A, B and C in the Exit Plane

Zone	Area [m^2]
A	0.002046
B	0.001636
C	0.002132

Table 3. Calculated Areas for Zones A, B and C

The mass-averaged total pressure and temperature in the exhaust duct were obtained from:

$$\bar{P}_{t,out} = \frac{\dot{m}_A P_{t,out,A} + \dot{m}_B P_{t,out,B} + \dot{m}_C P_{t,out,C}}{\sum_{i=A}^{C} \dot{m}_i} \qquad (7)$$

$$\bar{T}_{t,out} = \frac{\dot{m}_A T_{t,out,A} + \dot{m}_B T_{t,out,B} + \dot{m}_C T_{t,out,C}}{\sum_{i=A}^{C} \dot{m}_i} \qquad (8)$$

The total pressure ratio, total temperature ratio and efficiency were then found by:

$$\pi = \frac{\overline{P}_{t,out}}{\overline{P}_{t,in}} \quad (9) \qquad \tau = \frac{\overline{T}_{t,out}}{\overline{T}_{t,in}} \quad (10) \qquad \eta = \frac{\pi^{\frac{\gamma-1}{\gamma}} - 1}{\tau - 1} \quad (11)$$

Next, the thrust force was obtained from;

$$F_{thrust} = \dot{m}_{in}\left(u_{out} - u_{in}\right) \quad (12)$$

where u_{in} was assumed to be zero and;

$$u_{out} = M_{out}\sqrt{\gamma R T_{out}} \quad (13)$$

$$T_{out} = \frac{\overline{T}_{t,out}}{1 + \frac{\gamma - 1}{2} M_{out}^{\ 2}} \quad (14)$$

$$M_{out} = \left\{ \frac{2}{\gamma - 1}\left[\left(\frac{\overline{P}_{t,out}}{P_{atm}} \right)^{\frac{\gamma-1}{\gamma}} - 1 \right] \right\}^{\frac{1}{2}} \quad (15)$$

Finally, the power absorbed by the CFF was calculated from;

$$Power = \dot{m}_{in} c_p \left(\overline{T}_{t,out} - \overline{T}_{t,in}\right) \quad (16)$$

After all the parameters were calculated, the correction to standard day conditions was accomplished as follows;

$$\delta = \frac{P_{t,in}}{P_{t,std}};\ \theta = \frac{T_{t,in}}{T_{t,std}} \quad (16)$$

$$\dot{m}_{corr} = \dot{m}\frac{\sqrt{\theta}}{\delta};\ N_{corr} = \frac{N}{\sqrt{\theta}};\ F_{corr} = \frac{F}{\delta};\ P_{corr} = \frac{P}{\delta\sqrt{\theta}} \quad (18)$$

Where $P_{t,std}$ is 101,325 Pa and $T_{t,std}$ is 288.1 K.

Data reduction using the above equations was performed real time using Ulvin_CFF_DAQ as described in APPENDIX A. Post processing was also performed on

the recorded raw data using EXCEL and than compared to the output from Ulvin_CFF_DAQ for the purpose of debugging the Ulvin_CFF_DAQ program. In order to get steady state values, a time average of the data was taken at each test point by recording five data points for each test point, calculating the corrected values (equations 1 through 17) and than taking an average of the calculated values.

C. TEST PLAN

The baseline configuration of the CFTA was used for this experiment with exit valve throttling accomplished by using the butterfly valve at the exhaust duct. Initial runs at 1000 RPM to 6000 RPM were conducted without the use of the butterfly valve in order to verify that instrumentation was working correctly and that the vibration levels remained within an acceptable range. Once the system was verified, throttling runs were conducted at the desired speeds from 3000 RPM to 6000 RPM with 500 RPM or 1000 RPM increments. To obtain the data for a speed line the initial test point was taken at an open throttle, see figure 6 (0 notch on the butterfly valve), with the desired speed and then for each data point the throttle was advanced to the next notched position, the desired RPM was obtained and the data was gathered using Ulvin_CFF_DAQ. The throttle position was advanced until the stall point was obtained, indicated by a drop in efficiency. The stall line of several speeds were obtained by advancing the throttle to the stall point and then opening the throttling valve, notch by notch to the open position.

III. RESULTS

A. OVERVIEW

Performance characteristics for the 6 inch diameter, 4 inch span cross-flow fan were gathered at rotational speeds from 3000 RPM to 6000 RPM. During a speed run, an average data point was calculated for each throttle position, with an error bar for each point ranging between the highest and lowest measured values at each point. For repeatability, multiple test runs on separate days were taken for each rotational speed (excluding 4500 RPM). The stall characteristics of the CFF at 3000, 4000, 5000 and 6000 RPM were obtained by advancing the throttle until there was a large drop in efficiency, and then opening the throttle back to the initial open condition. The raw data and final calculated data is presented in Appendix B.

The mass flow rate, thrust and power were normalized to a span of 1 meter by multiplying by a length of 1m and dividing by a span of 4 inches. This allowed for direct comparison to normalized data from CFFs with the same diameter and different span lengths. The performance data obtained from the 6 inch diameter, 4 inch length (6D 4L) CFF was compared to the performance data of both the 6 inch diameter, 6 inch length (6D 6L) [9] and 6 inch diameter, 1.5 inch length (6D 1.5L) [1] CFFs tested in previous experiments. The final calculated data for both 6D 6L and 6D 1.5L CFFs is presented in Appendix C.

B. PERFORMANCE OF 6 IN DIAMETER, 4 IN SPAN ROTOR

The mass flow rate is shown in Figure 11 as a function of speed for the different throttle settings of the exhaust duct. For the constant speed test runs, the mass flow rate decreased as the throttle was advanced from 0 notch to 3 2/3 notch.

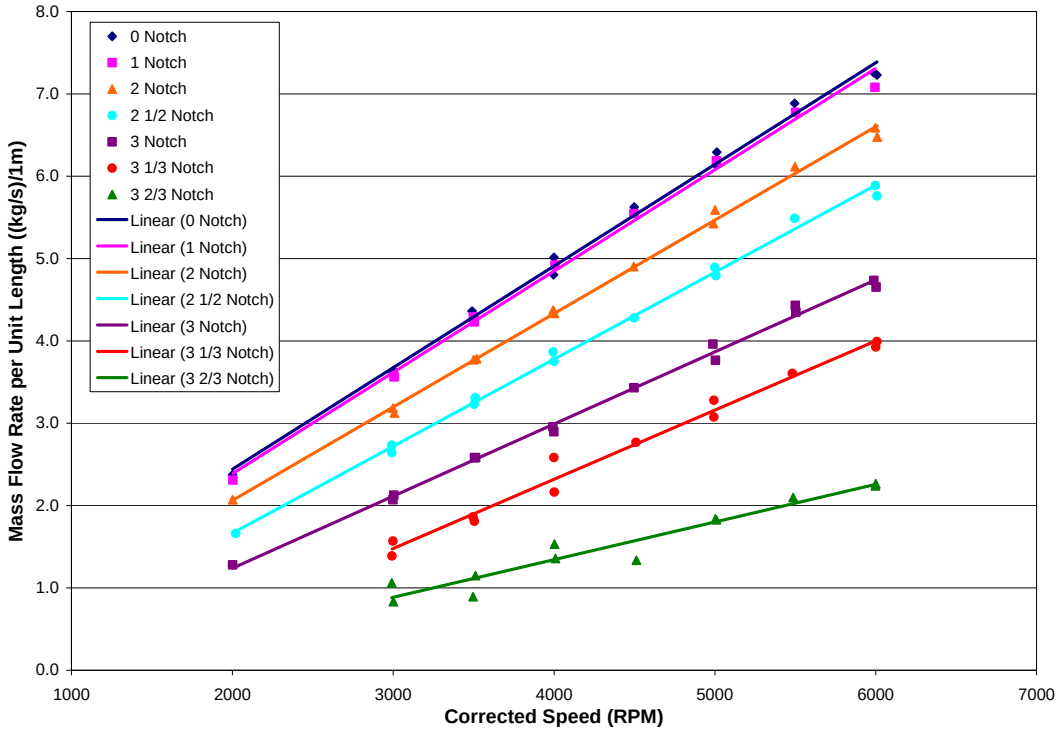

Figure 11. Mass flow rate vs. corrected speed along throttling lines

Constant speed curves are shown in Figure 12 and 13 for total-to-total pressure ratio and temperature ratio respectively as a function of mass flow rate. Data was gathered by taking an average data point at open throttle after stabilization and then slowly closing the throttle, taking an average data point for each throttle setting until stall was reached at the 3 2/3 notch position. Both the pressure ratio and the temperature ratio decrease with a decreasing mass flow rate as the throttle is closed. However at stall the temperature ratio increased. The data generally following a 3rd or 4th order polynomial line, depending on the speed. The pressure ratio and the temperature ratio curves increase with an increase in speed with a maximum pressure ratio of about 1.0725 and temperature ratio of 1.026, obtained at open throttle for the 6000 RPM speed. Multiple test runs on separate days were conducted for all speed lines with the exception of 4500 RPM.

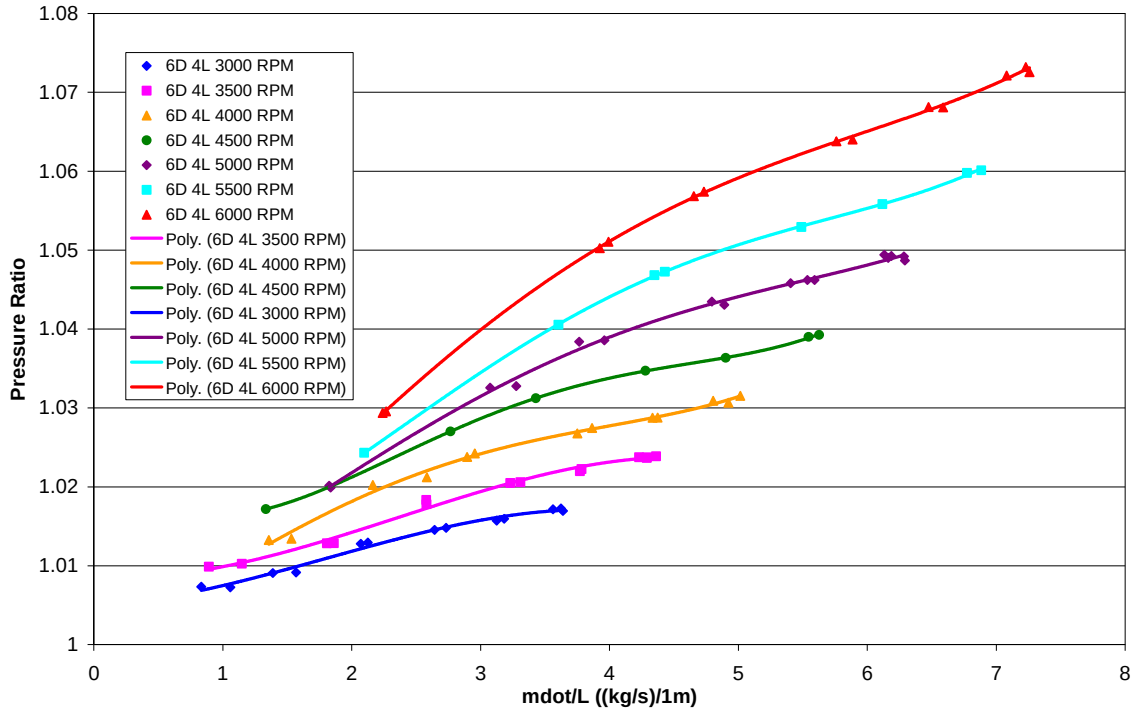

Figure 12. Pressure ratio vs. mass flow rate for constant speed lines

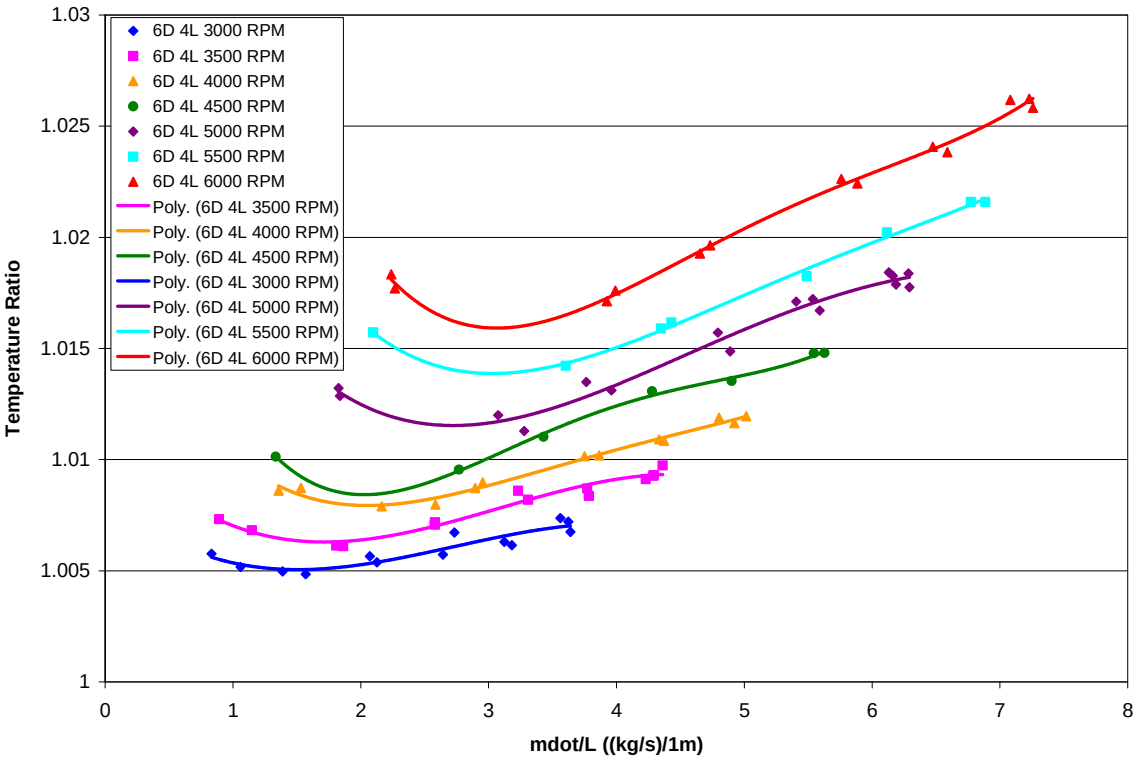

Figure 13. Temperature ratio vs. mass flow rate for constant speed lines

The efficiency as a function of mass flow rate is shown in Figure 14. At rotational speeds of 5000, 5500 and 6000 RPM peak efficiencies of about 0.83 were measured. At 4000 RPM and above the efficiencies increased from the open throttle position (highest mass flow rate) until they peaked at the 3 notch position and then decreased until the cross-flow fan reached stall at the 3 2/3 notch position, as shown in Figure 15.

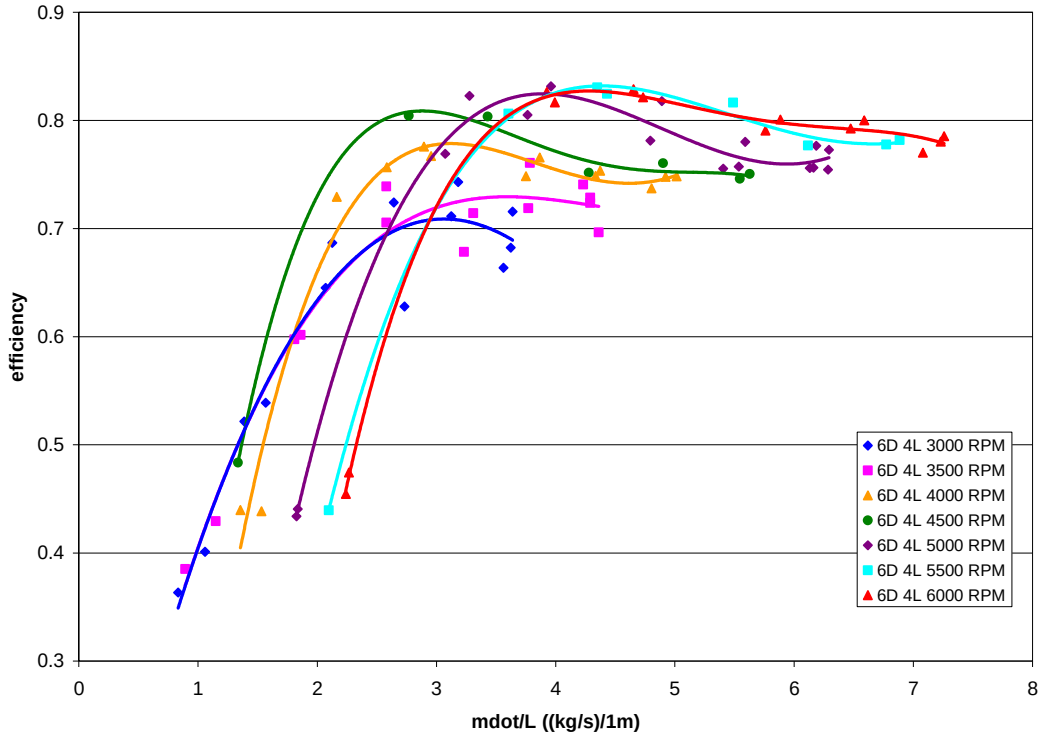

Figure 14. Efficiency vs. mass flow rate for constant speed lines

Multiple test runs for each speed were conducted to measure the repeatability of each test point. There was notable variance in the efficiency between test days at lower rotational speeds of 3000 RPM and 3500 RPM as shown in figure 16. For each throttle position multiple data points were gathered, reduced to the performance parameters and then averaged to get a single data point. An error band was created to show the high and low range for each set of data points. The variance in efficiency between test days and the error bands for speeds above 3500 RPM are shown in Figures 16 and 17. Figure 18 shows that the pressure ratio stays relatively constant from one day to the next while the temperature ratio changes significantly, indicating that the variance in the efficiency is due to the temperature ratio.

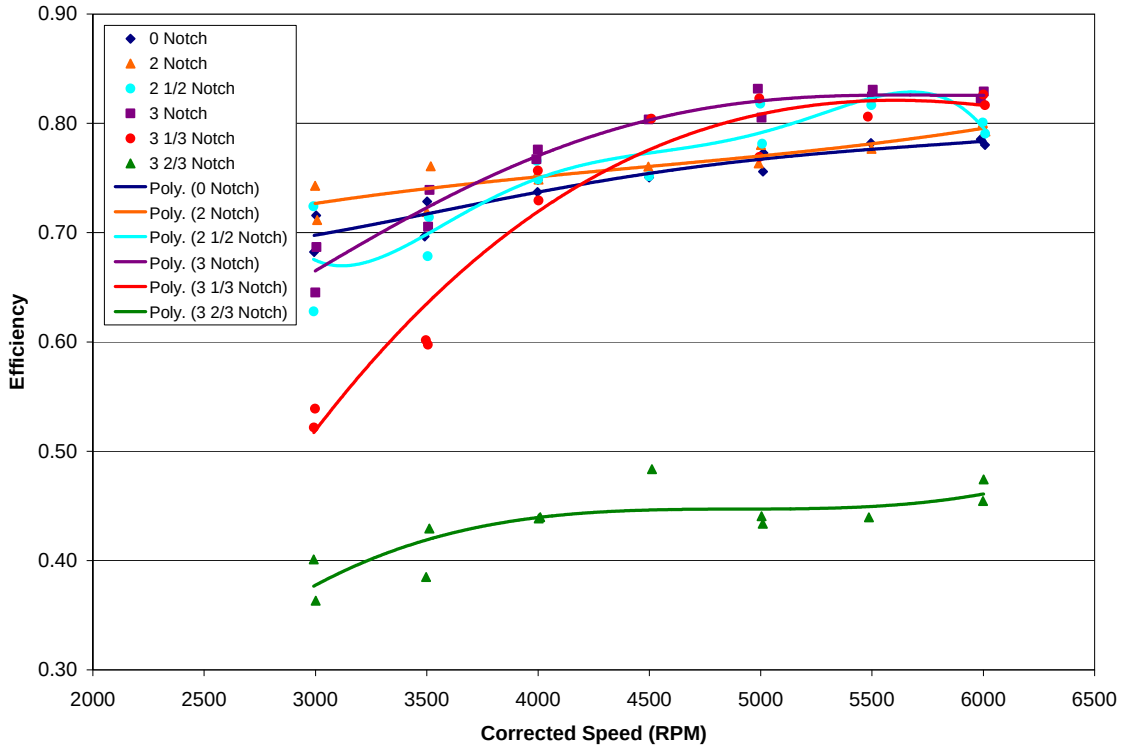

Figure 15. Efficiency vs. corrected speed along throttle lines

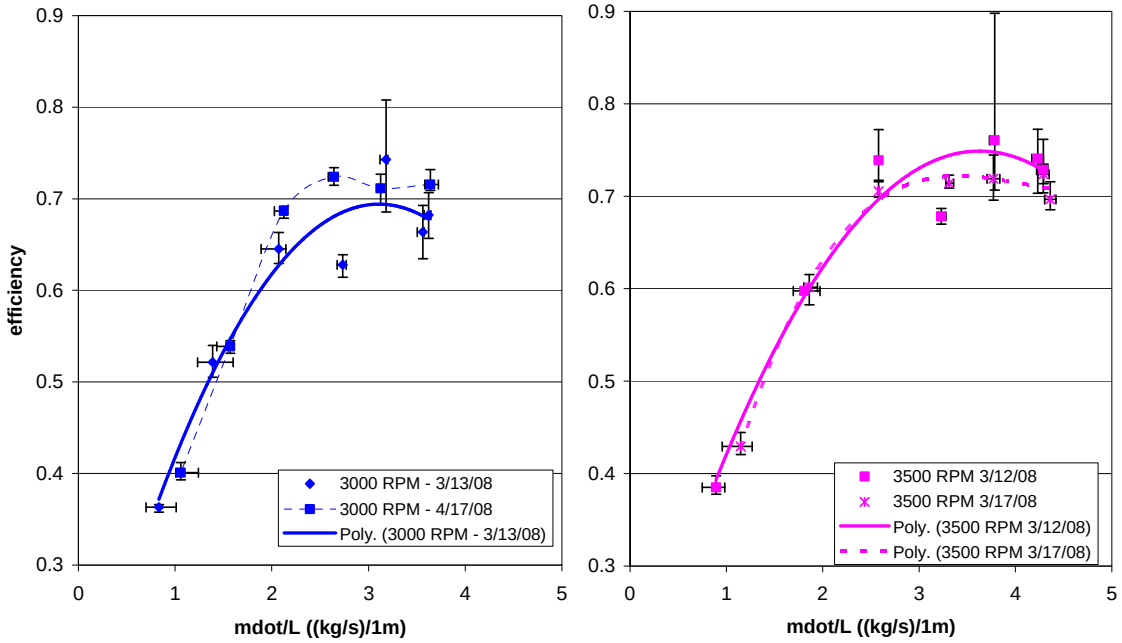

Figure 16. Efficiency repeatability for 3000 and 3500 RPM

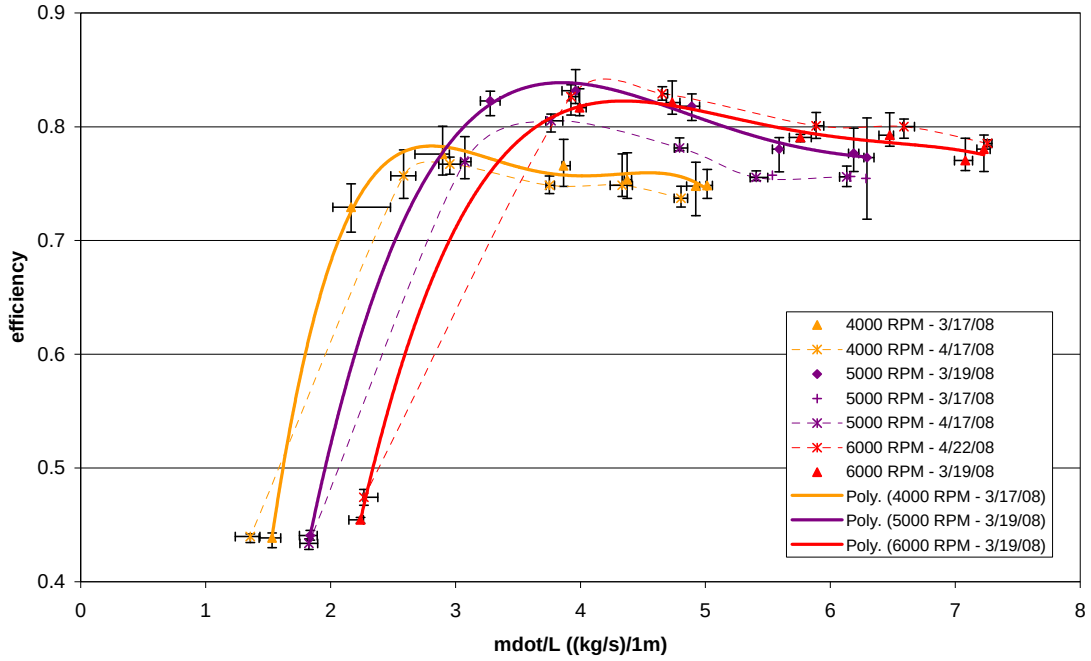

Figure 17. Efficiency repeatability for 4000, 5000 and 6000 RPM

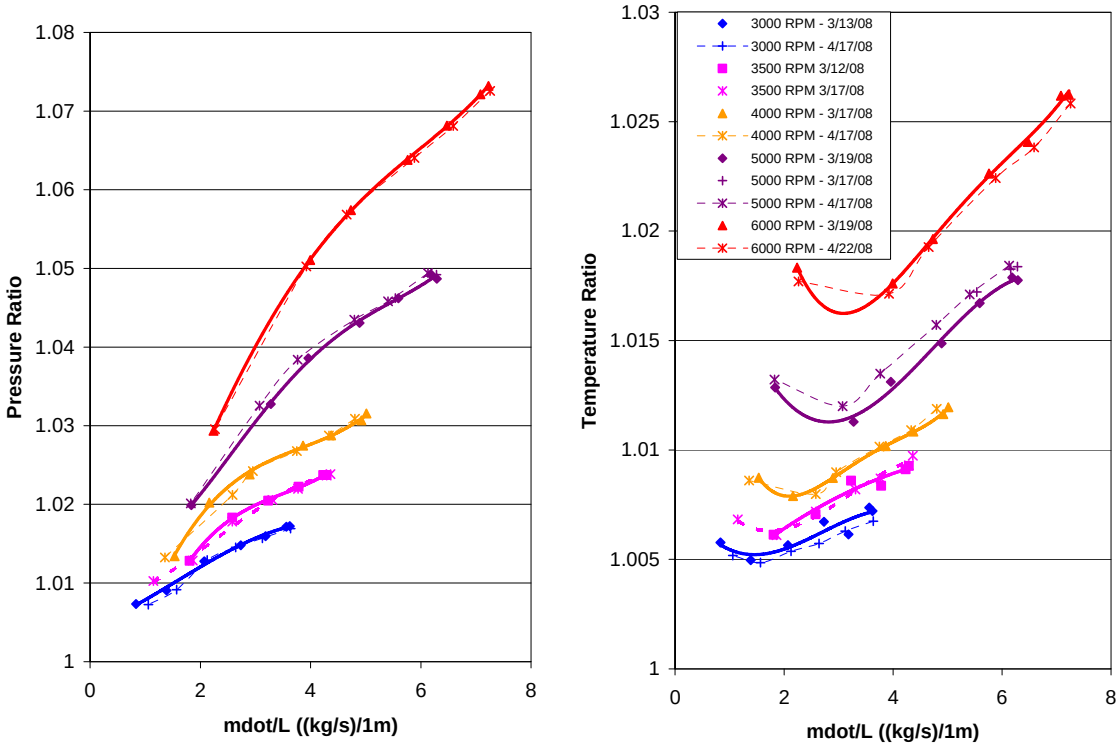

Figure 18. Pressure ratio and temperature ratio repeatability

Figures 19 and 20 show corrected thrust as a function of corrected speed and mass flow rate. The cross-flow fan gives the largest thrust at open throttle, with thrust increasing as the rotational speed increases. The increase in thrust was consistent with the increase in mass flow rate and exit velocity speeds as the rotational speed was increased. The largest measured thrust per unit length was calculated as about 750 N/m at open throttle and 6000 RPM.

The power versus corrected speed and mass flow rate are shown in Figure 21 and 22. As noted in Reference 9, for the open and 2 notch throttle settings the power increased nearly exponentially with speed. The increase in thrust with rotational speed is offset by the decrease in thrust to power ratio as shown in Figure 23 with thrust to power ratio versus mass flow rate shown for constant speed lines. The highest thrust to power is found at the lowest rotational speed, 3000 RPM with the thrust to power ratio decreasing with rotational speed. The peaks in the thrust-to-power curves correspond to the maximum efficiency peaks for each speed line.

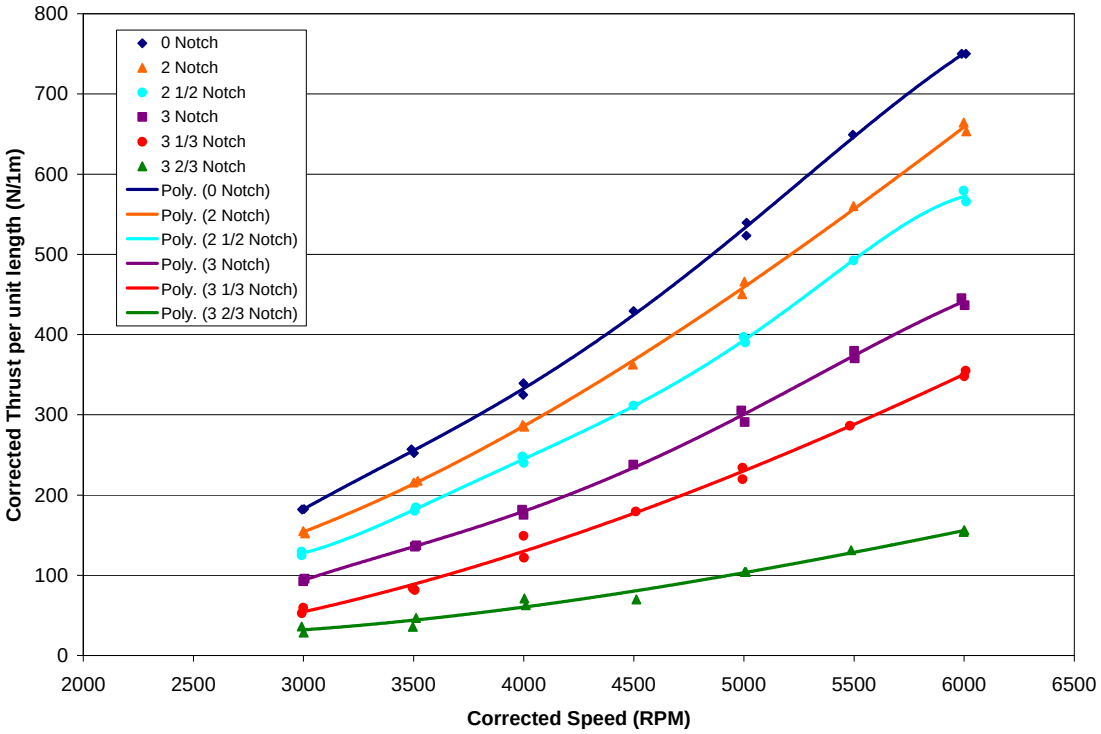

Figure 19. Thrust vs. corrected speed along throttle lines

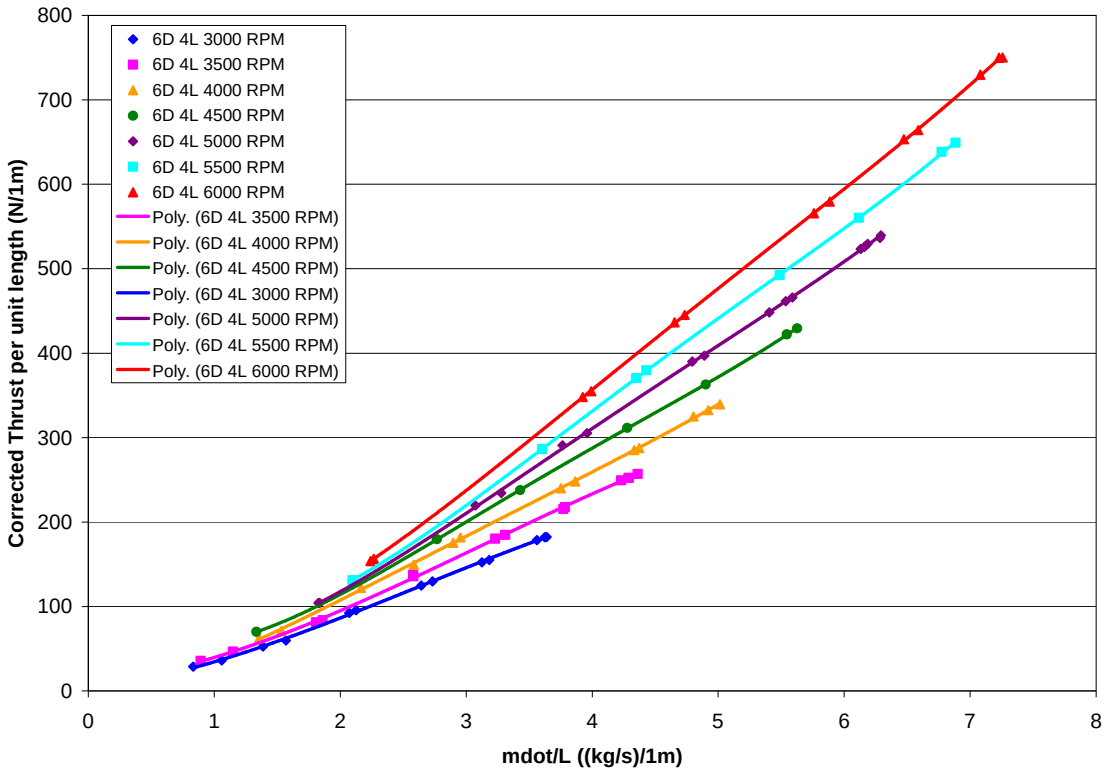

Figure 20. Thrust vs. mass flow rate for constant speed

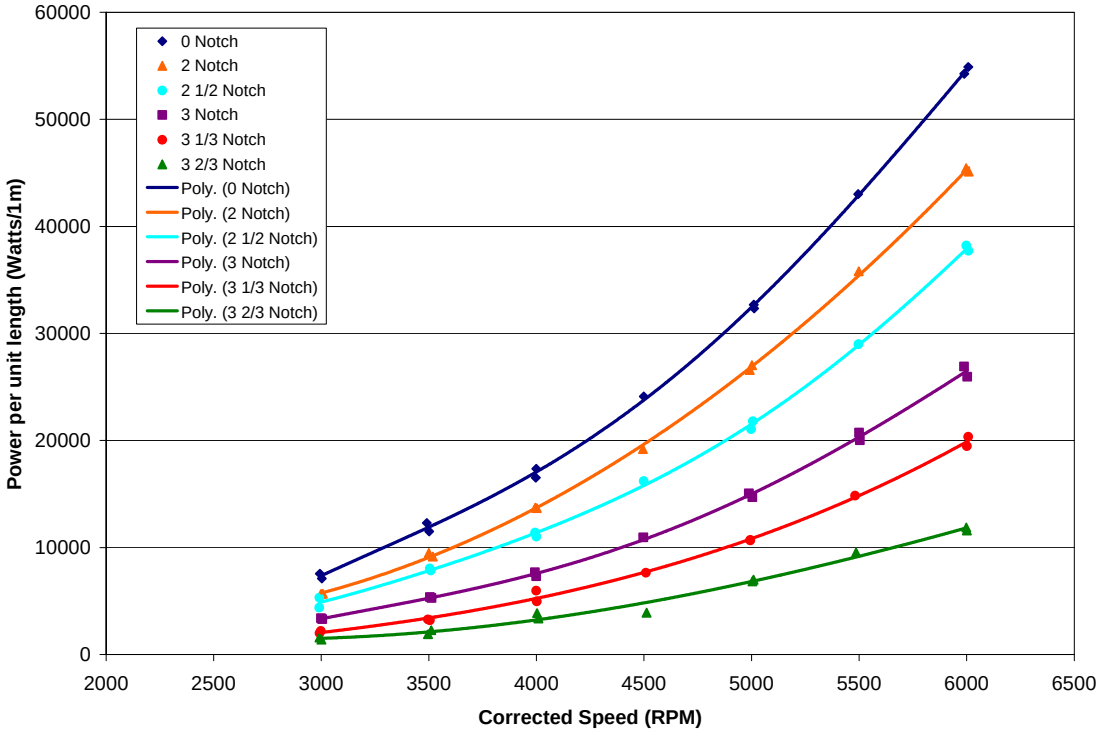

Figure 21. Power vs. corrected speed

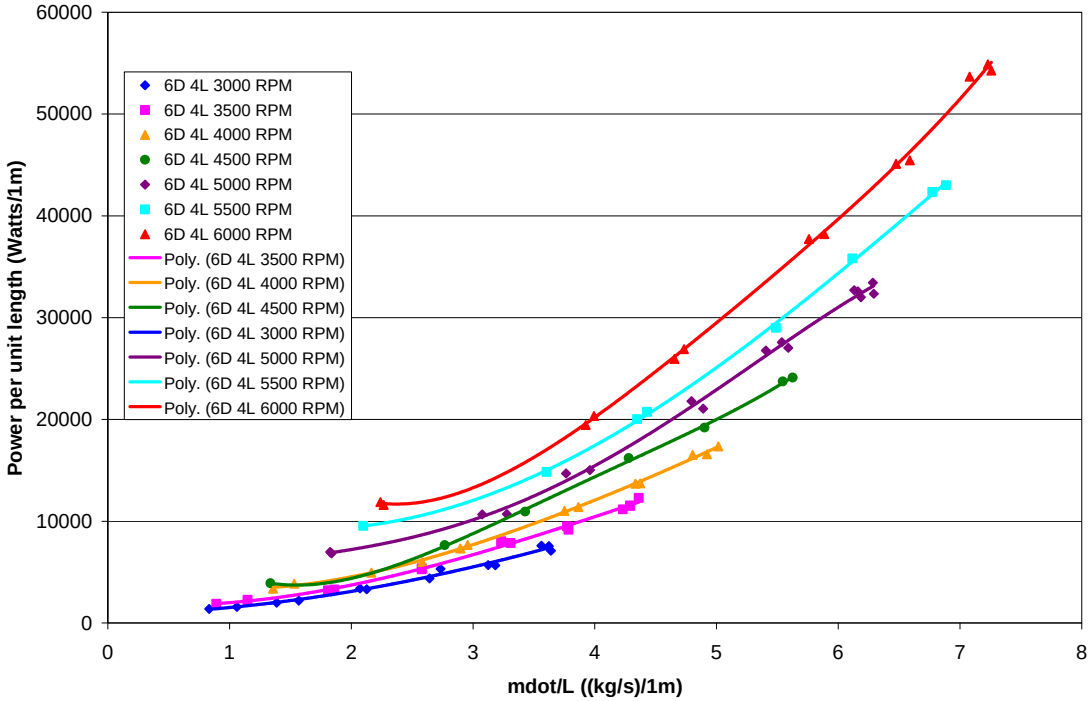

Figure 22. Power vs. mass flow rate

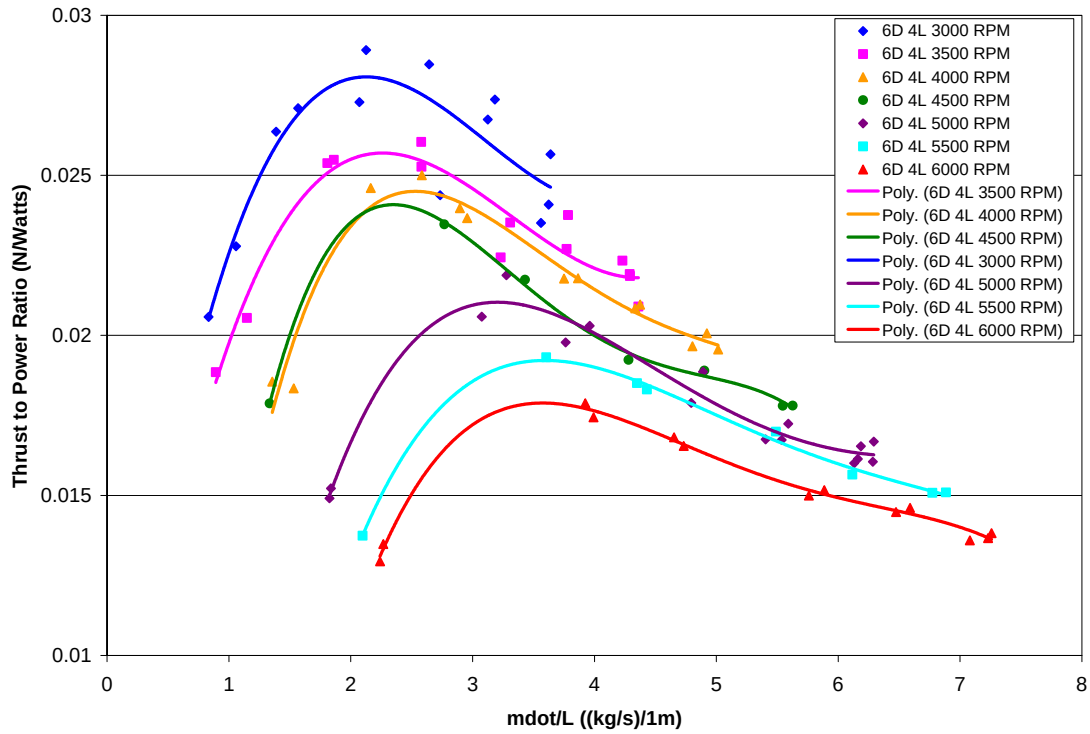

Figure 23. Thrust to power ratio vs. mass flow rate

The stall characteristics of the cross-flow fan were examined by advancing the exhaust throttle from the stabilized open condition to the notch position where the efficiency had a large drop and then slowly opening the throttle back to the open condition, taking data points at each notch position. The 6D 4L did not exhibit the deep stall that was revealed in the 6D 1.5L CFF tested in Reference 3, however the maximum test speed for the 6D 4L was 6000 RPM and the 6D 1.5L rotor did not exhibit deep stall until it was tested at 8000 RPM. The 6D 4L cross flow fan had good recovery from stall with minimal hysteresis and near peak efficiencies recovered at the 3 notch position, as shown in Figure 24.

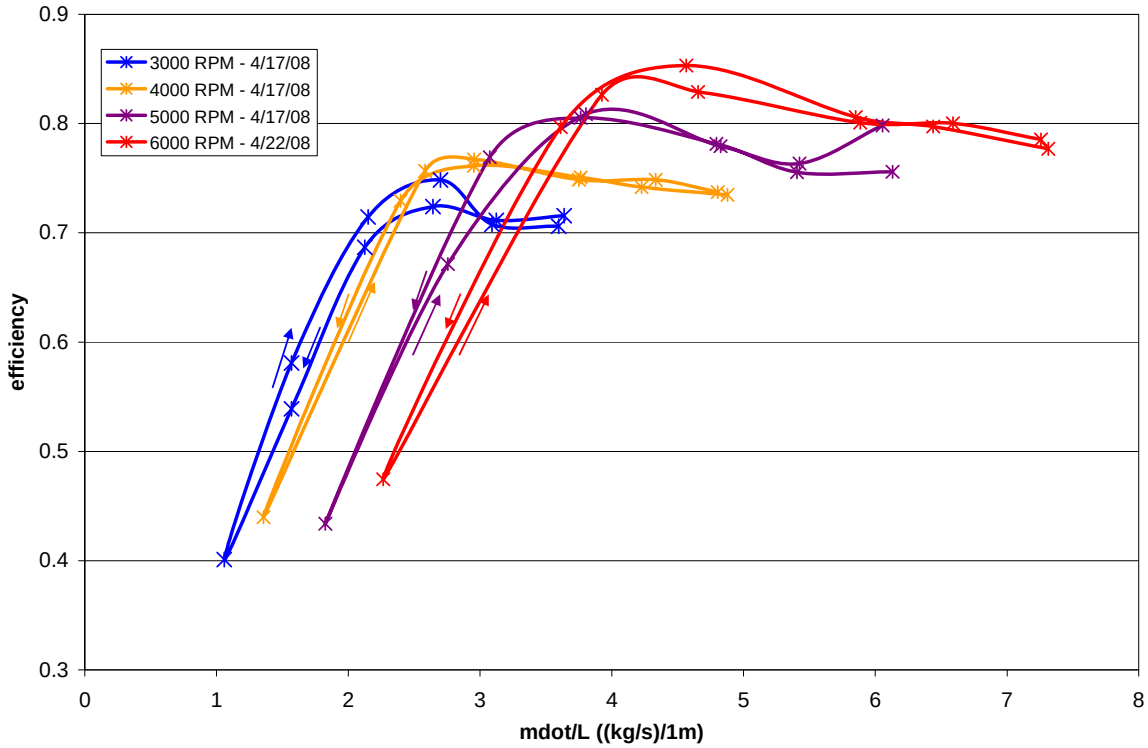

Figure 24. Efficiency vs. mass flow rate during stall and unstall conditions

C. PERFORMANCE COMPARISON BETWEEN DIFFERENT SPAN LENGTH ROTORS

A comparison between the tested 6 inch diameter, 4 inch span (6D 4L) CFF and the previously tested 6 inch diameter, 6 inch span and 1.5 inch span CFFs (6D 6L and 6D 1.5L respectively) show that there is decent agreement in the performance data. The

efficiency for the 6D 4L CFF was consistently higher than both the 6D 1.5L and 6D 6L CFFs with exception to 3000 RPM, shown in Figure 25. The comparison between the 6D 4L CFF to the 6D 1.5L and 6D 6L CFFs show that the agreement in efficiency between the 6D 4L and 6D 6L is better than between the 6D 4L and the 6D 1.5L. As noted in Reference 3, the smaller CFF, the 6D 1.5L had more wetted area to volume, hence the lower efficiency was due to viscous losses. It is important to note that at speed above 3000 RPM both the 6D 6L and 6D 1.5L exhibit more scatter in the data than that of the 6D 4L CFF.

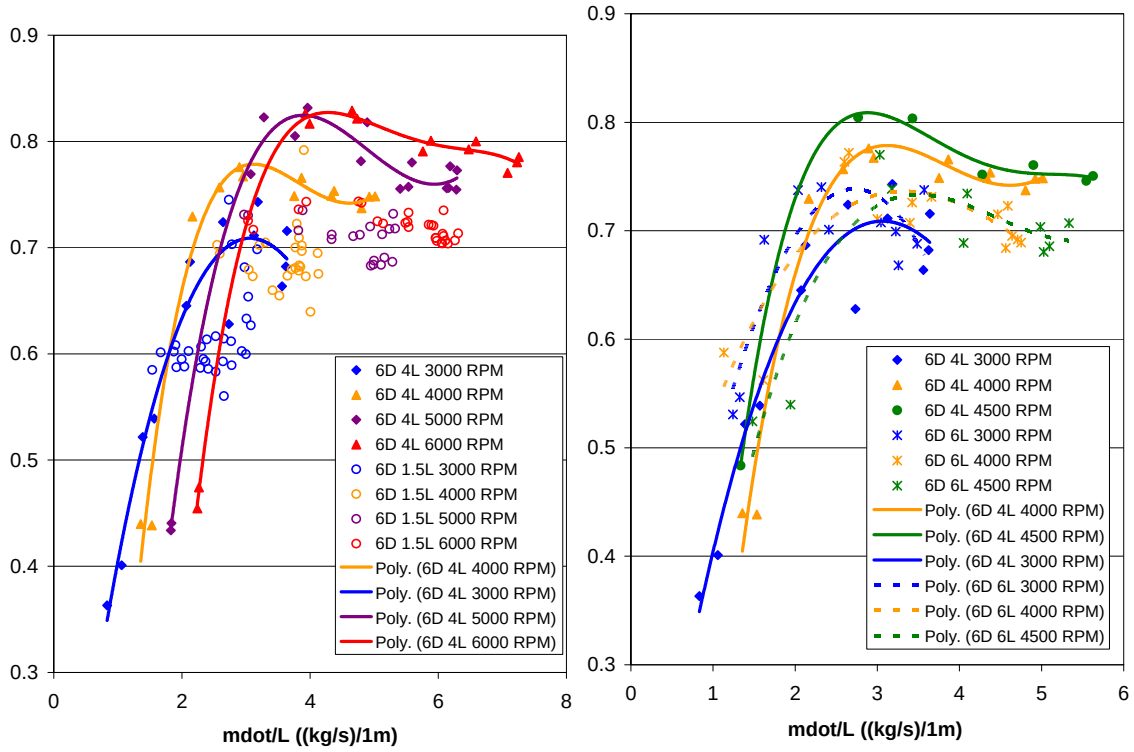

Figure 25. Comparison of efficiency vs. mass flow rate for multiple span CFFs

The pressure ratio and temperature ratio versus mass flow rate are shown for the various CFFs in Figures 26 and 27. The pressure ratio shows good agreement between the three different span length cross flow fans. The agreement with the temperature ratio data is not as good, with larger temperature ratios at constant speeds for the 6D 1.5L CFF. Also, note that the maximum flow rate for the 6D 1.5L CFF is significantly lower than both the 6D 4L and 6D 6L CFFs.

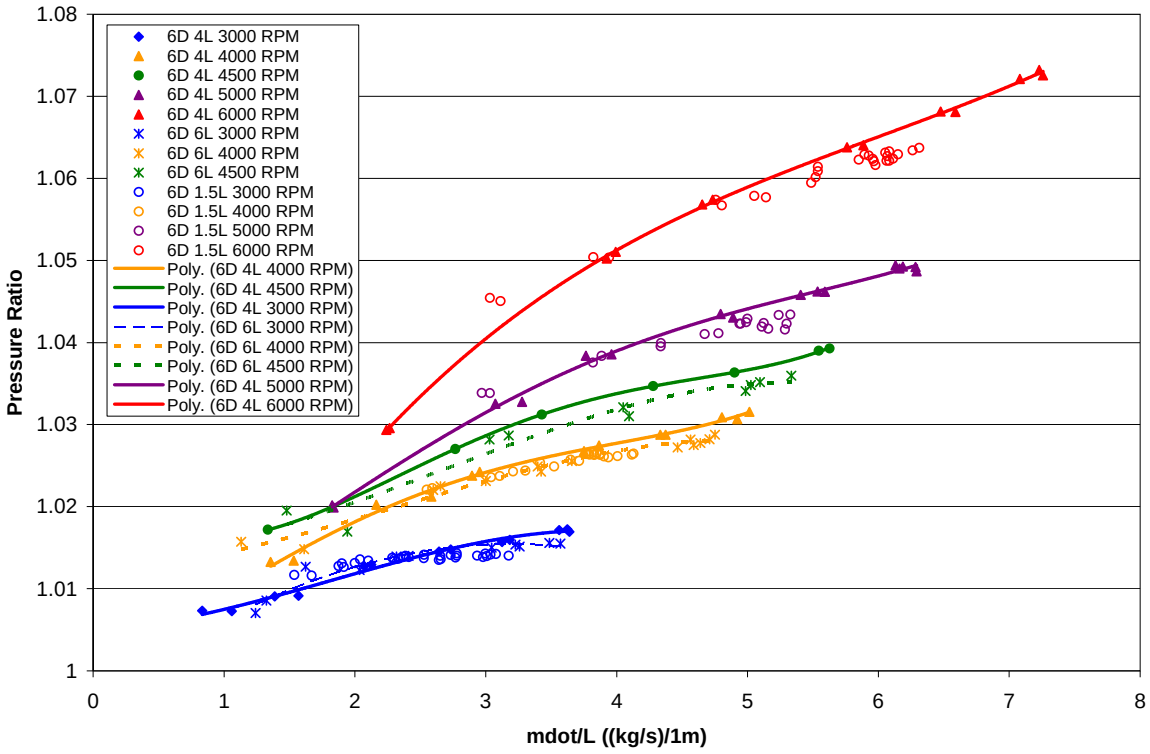

Figure 26. Comparison of pressure ratio vs. mass flow rate for multiple span CFFs

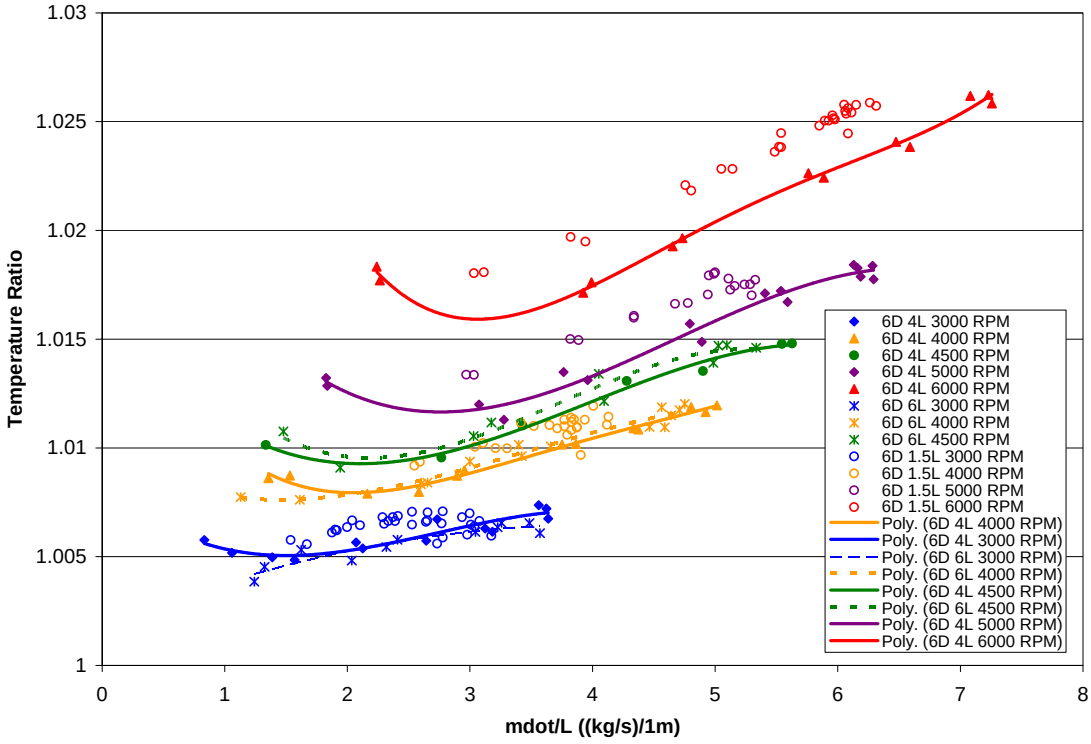

Figure 27. Comparison of temperature ratio vs. mass flow rate for multiple span CFFs

The corrected thrust versus mass flow rate is shown in Figure 28 for comparison of the three different CFFs. The correlation of the data is good with the 6D 1.5L and 6D 6L thrust data falling on or near the trend line for the 6D 4L data; however, compared to both previously tested rotors, the 6D 4L demonstrated a larger maximum thrust. The 6D 4L CFF demonstrated a maximum thrust value of 750 N/m at open throttle, 6000 RPM while the 6D 1.5L CFF exhibited a maximum thrust of 618 N/m. At 4500 RPM, the maximum test speed of the 6D 6L CFF, the 6D 4L rotor exhibited a maximum thrust of 429 N/m while the 6D 6L rotor had a maximum thrust of 370 N/m.

The reduced span 6D 1.5L CFF drew more power than the other two larger CFFs as shown in Figure 29. The increase in power for the 6D 1.5L rotor was expected due to the inefficiencies resulting from the increased viscous effects with respect to volume flow. The increase in power for the 6D 1.5L CFF is observable in the thrust to power ratio as shown in Figure 30 where the 6D 1.5L CFF demonstrates a lower thrust to power ratio than both the 6D 4L and 6D 6L rotor.

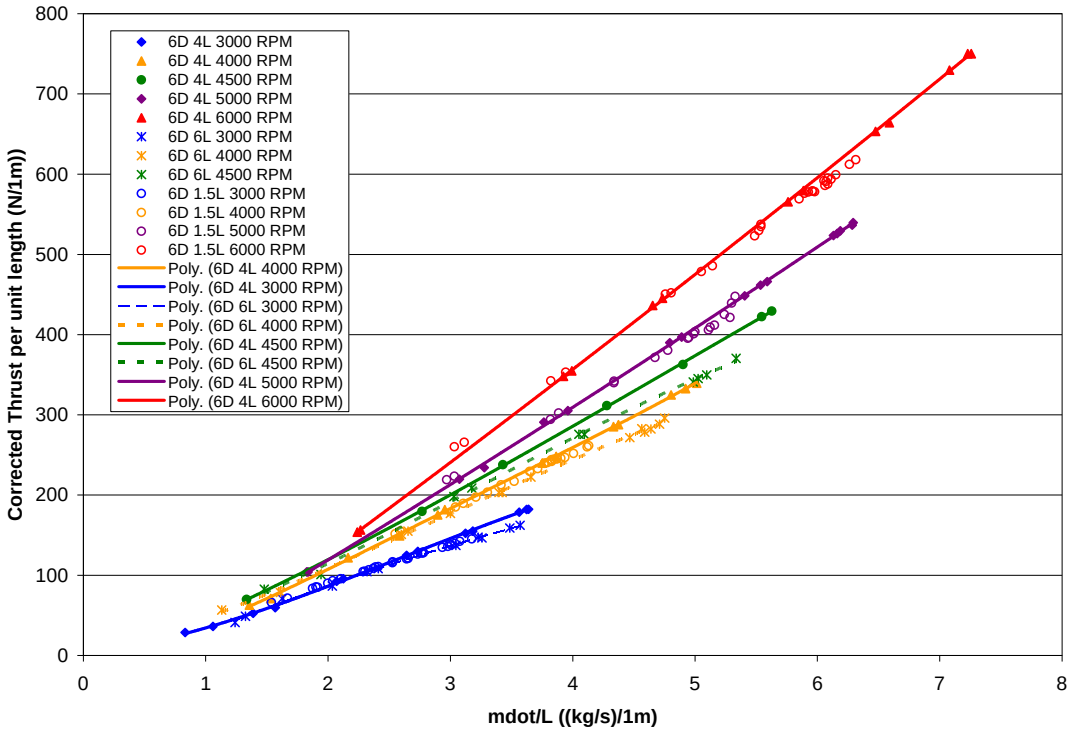

Figure 28. Comparison of corrected thrust vs. mass flow rate for multiple span CFFs

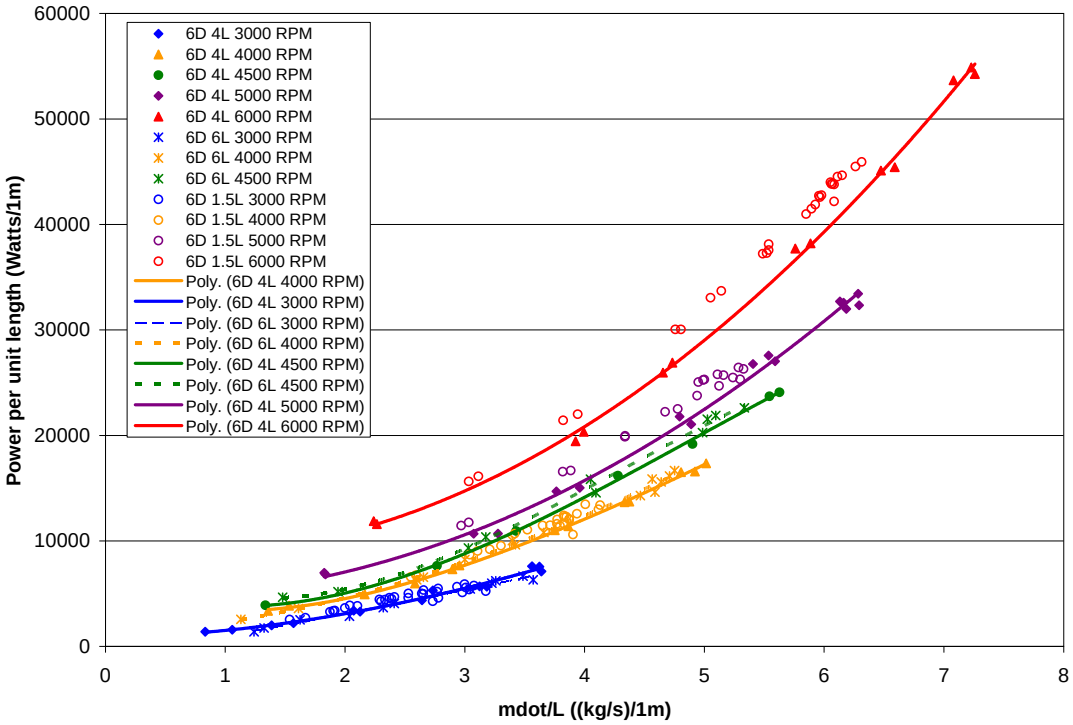

Figure 29. Comparison of power vs. mass flow rate for multiple span CFFs

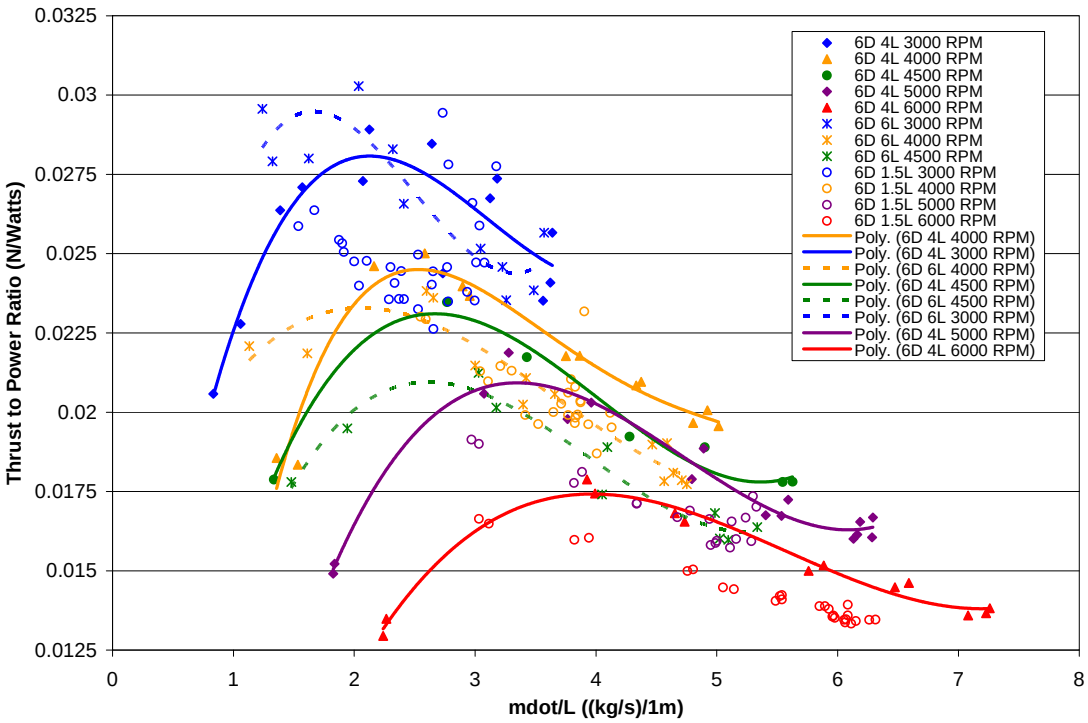

Figure 30. Comparison of thrust to power ratio vs. mass flow rate for multiple span CFFs

IV. SUMMARY AND CONCLUSION

The 6 inch diameter, 4 inch span cross-flow fan outperformed both the 6 inch diameter, 1.5 inch span and the 6 inch diameter, 6 inch span cross-flow fans. The maximum thrust for the 6D 4L was 750 N/m at open throttle, 6000 RPM compared to the 618 N/m for the 6D 1.5L CFF. The modified construction of the 6D 4L CFF allowed for it to be safely tested at 6000 RPM, while the 6D 6L CFF failed at under 5000 RPM. At the lower test speed, 4500 RPM the 6D 4L exhibited a maximum thrust of 429 N/m while the 6D 6L rotor had a maximum thrust of 370 N/m. In rotational speeds above 3000 RPM the 6D 4L also exhibited higher thrust to power ratios than those exhibited by the other two rotors.

The peak efficiency for the 6D 4L rotor was 83% at both 6000 and 5000 RPM while the efficiency of the 6D 1.5L rotor was significantly lower, 73% and 74% respectively. Compared to the 6D 6L rotor, the 6D 4L CFF had similar efficiencies. At lower rotational speeds, 4000 RPM and 4500 RPM the 6D 4L CFF had peak efficiencies of 78% and 80% compared to the 6D 6L CFF peak efficiencies of 77% for both speeds. The high scatter in the efficiency data for the 6D 6L rotor made comparison difficult. For complete comparison, a modified 6D 6L CFF should be tested at higher rotational speeds.

The 6D 4L rotor demonstrated good stall characteristics with full recovery from stall and minimal hysteresis compared to the 6D 1.5L CFF. The 6D 4L rotor did not demonstrate the deep stall that was observed in the 6D 1.5L CFF, however the 6D 4L rotor was not tested above 6000 RPM and the 6D 1.5L rotor did not demonstrate deep stall until 8000 RPM. Further testing should be conducted on the 6D 4L cross-flow fan to determine if deep stall occurs at higher rotational speeds.

In order to determine the optimal configuration for a cross-flow fan, future experiments should explore various blade configurations and housing geometries. Techniques for using numerical simulation of a CFF in computational fluid dynamics as demonstrated in Reference 11 should be applied to a 6 inch diameter CFF. Once an optimal configuration is determined, design of a prototype aircraft should be continued.

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APPENDIX A. ULVIN_CFF_DAQ PROGRAM

The structure of the Ulvin_CFF_DAQ data acquisition and data reduction program are shown below. The graphical user interface shown above in Figure 9 is run by the function "MAIN" shown below. Each function call is described in the order that they are called.

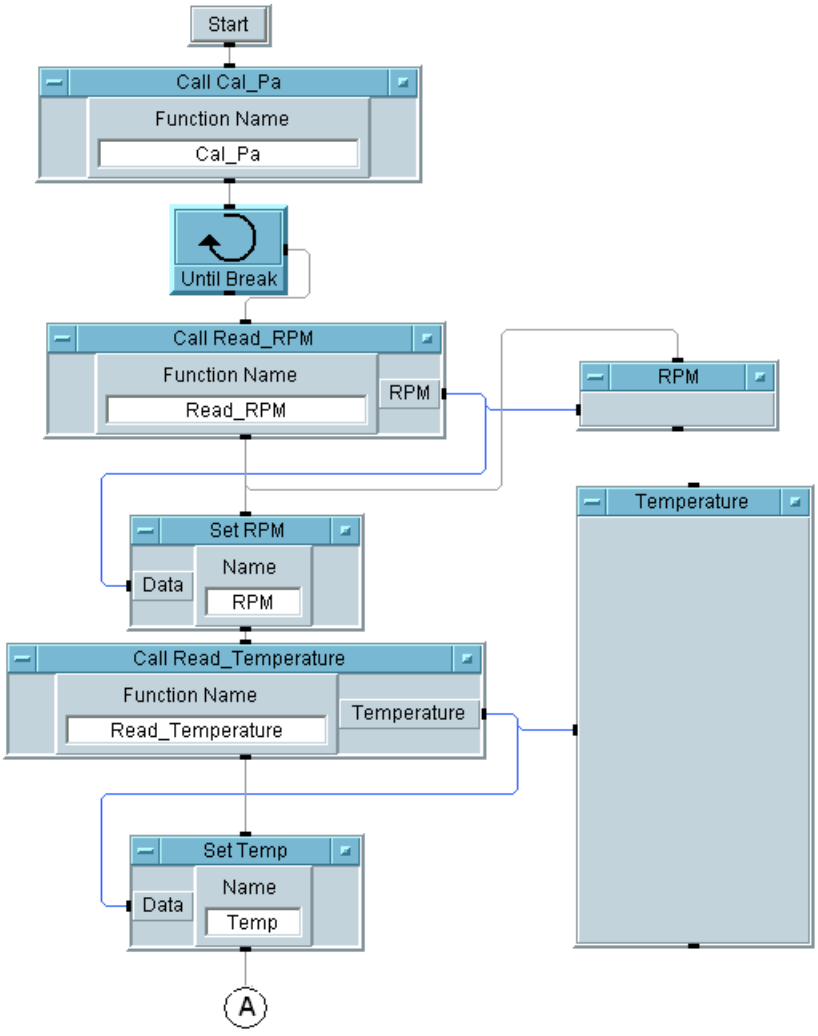

Figure A.01 "MAIN" function, page 1

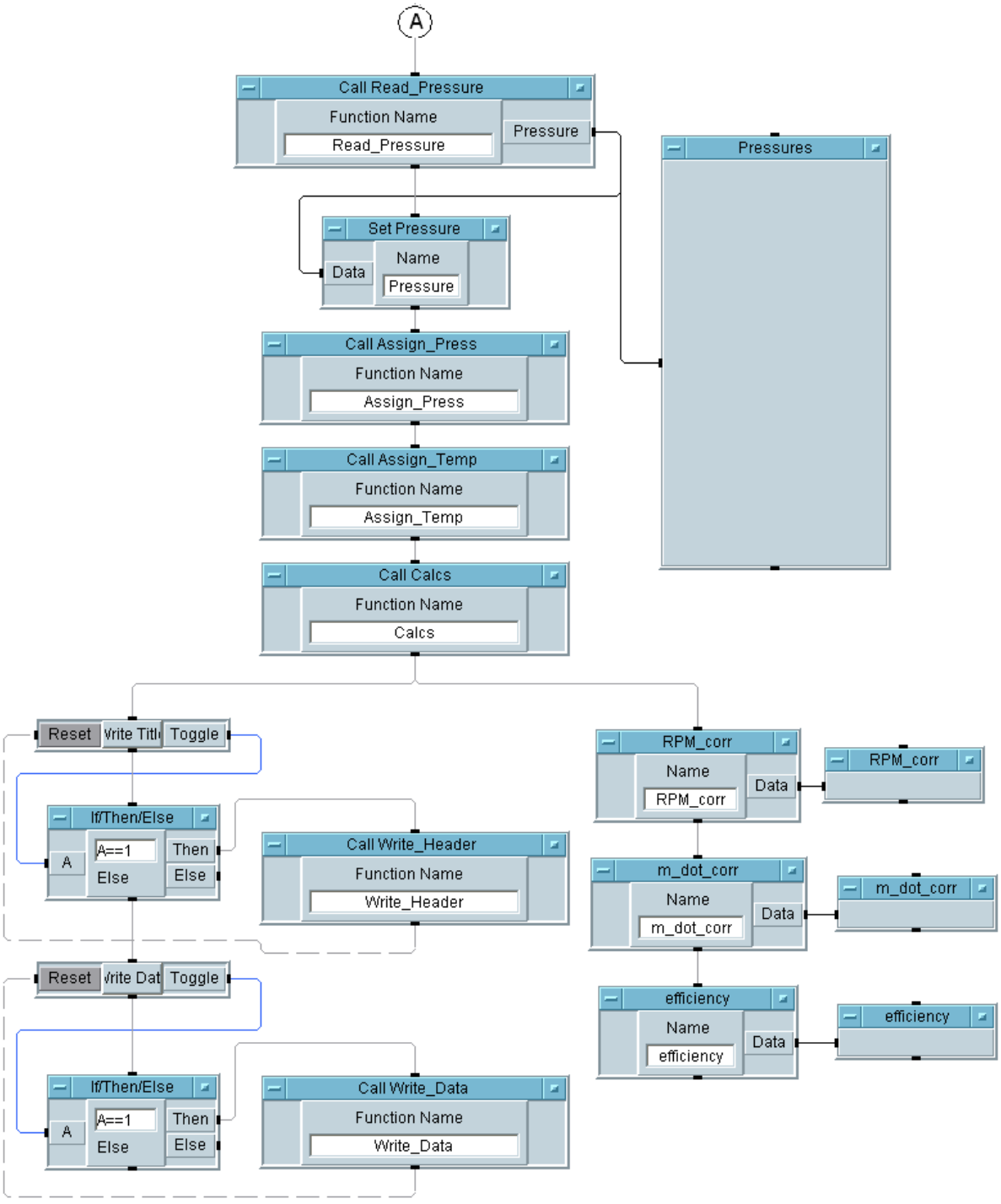

Figure A.02 “MAIN” function, page 2

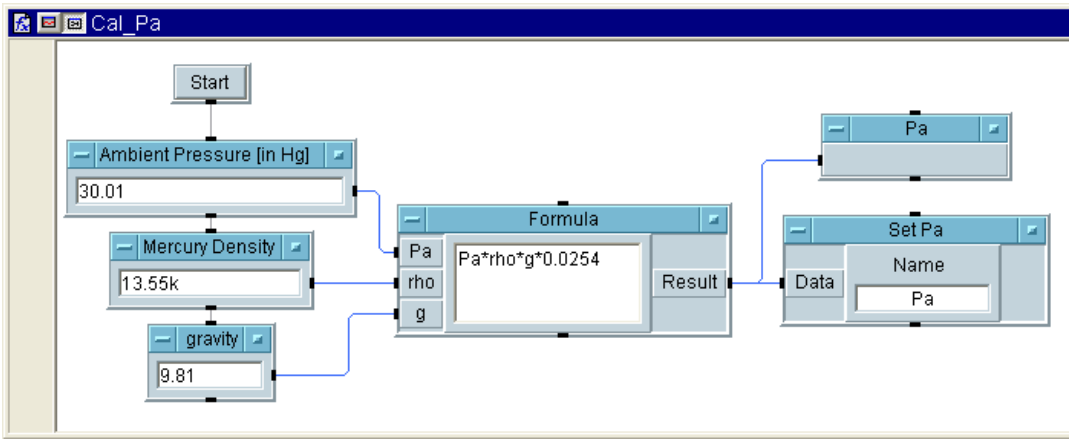

Figure A.03 "Cal_Pa" function, called by "MAIN"

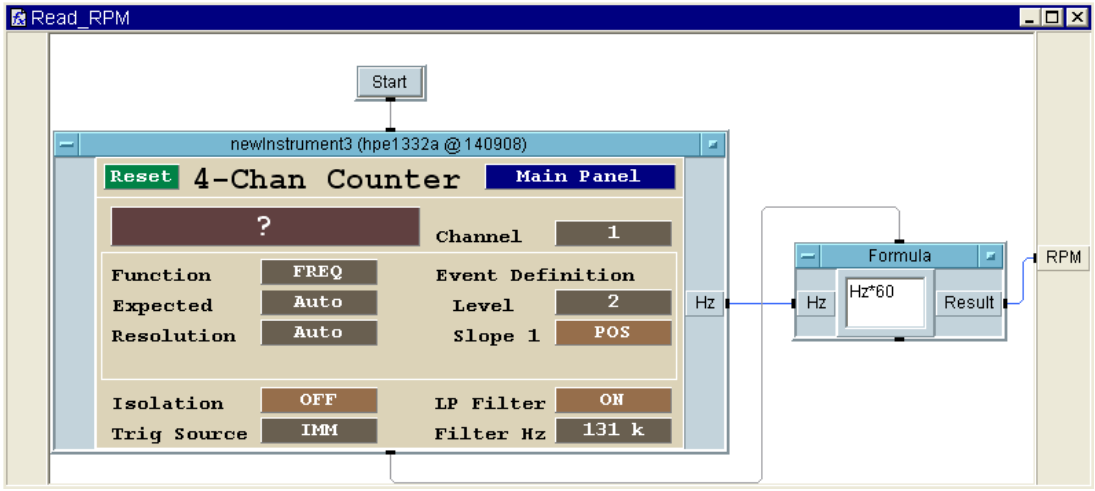

Figure A.04 "Read_RPM" function, called by "MAIN"

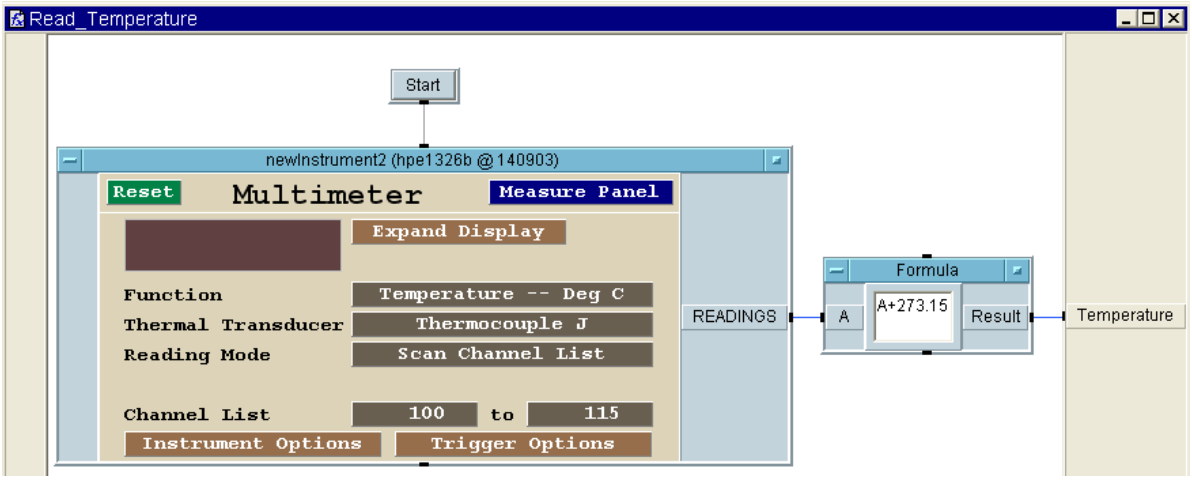

Figure A.05 "Read_Temperature" function, called by "MAIN"

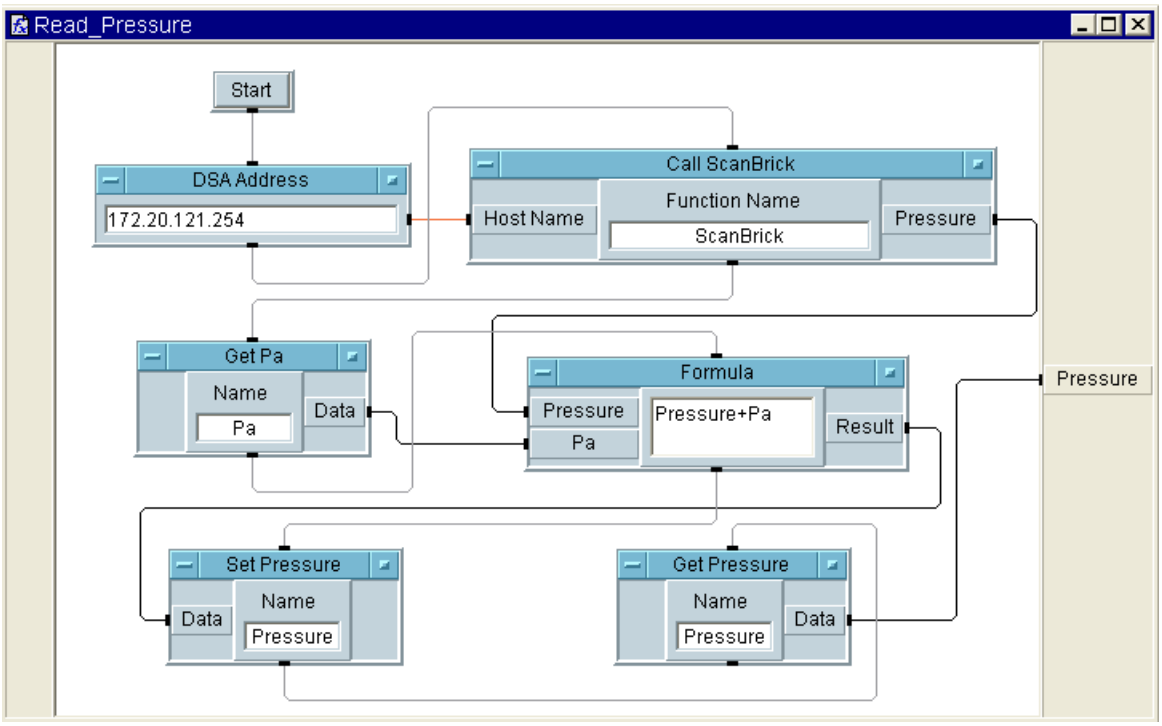

Figure A.06 "Read_Pressure" function, called by "MAIN"

The functions "ScanBrick" and "ScanDSA" shown below were unchanged from the original version in CFF_DAQ in the NPS thesis by Yu [10].

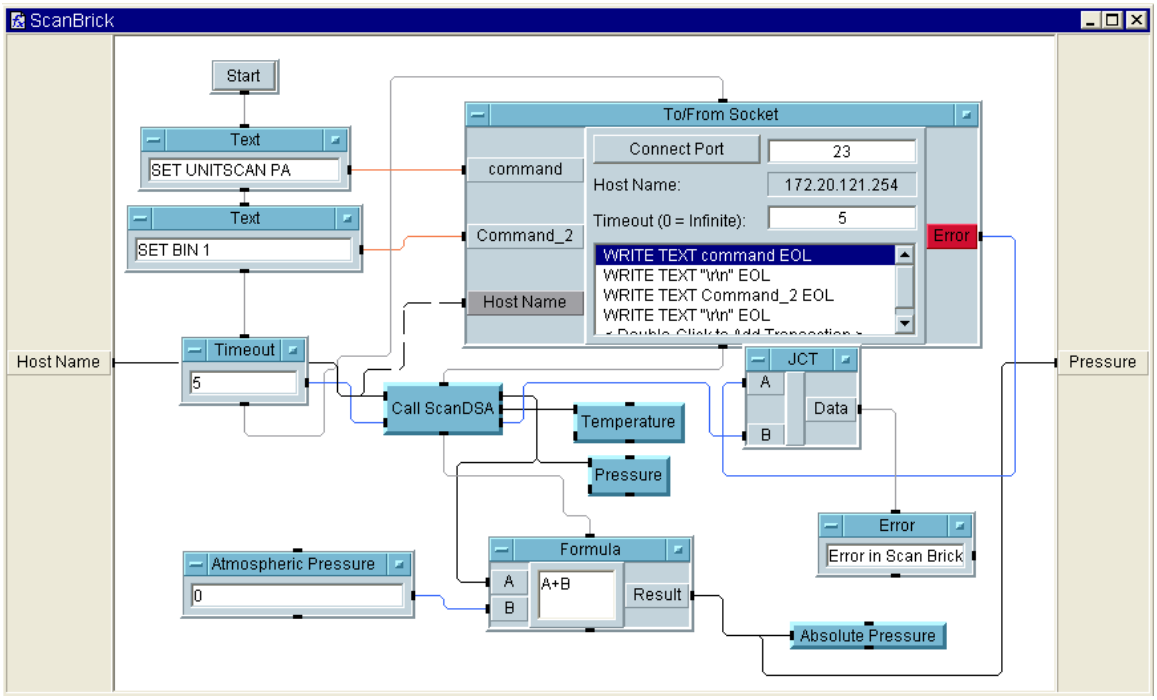

Figure A.07 "ScanBrick" function, called by "Read_Pressure"

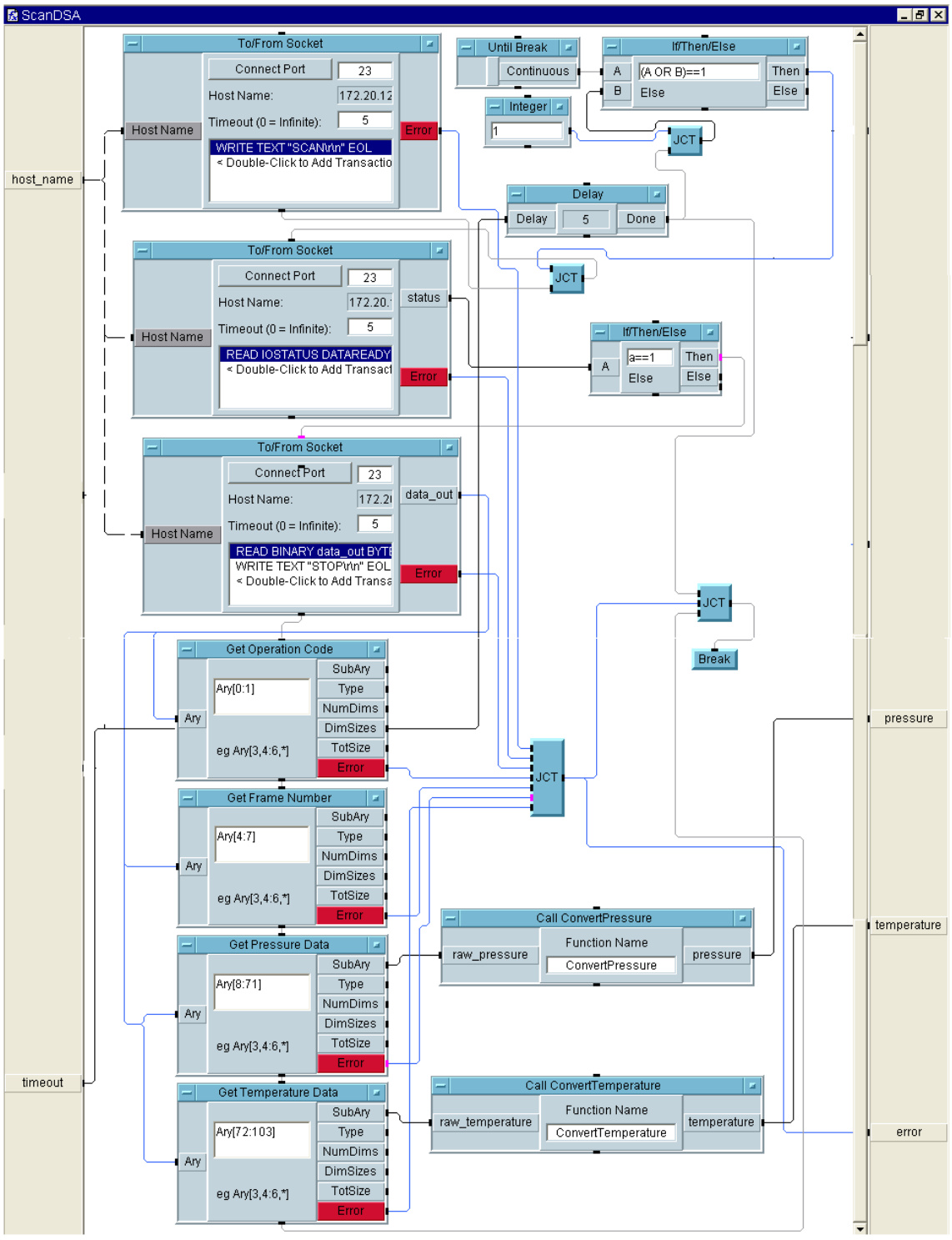

Figure A.08 “ScanDSA” function, called by “ScanBrick”

Functions “Assign_Pressure” and “Assign_Temperature” called by function “MAIN” are not shown. These functions take the pressure and temperature readings and assign the values to the global variable names as described in Tables 1 and 2.

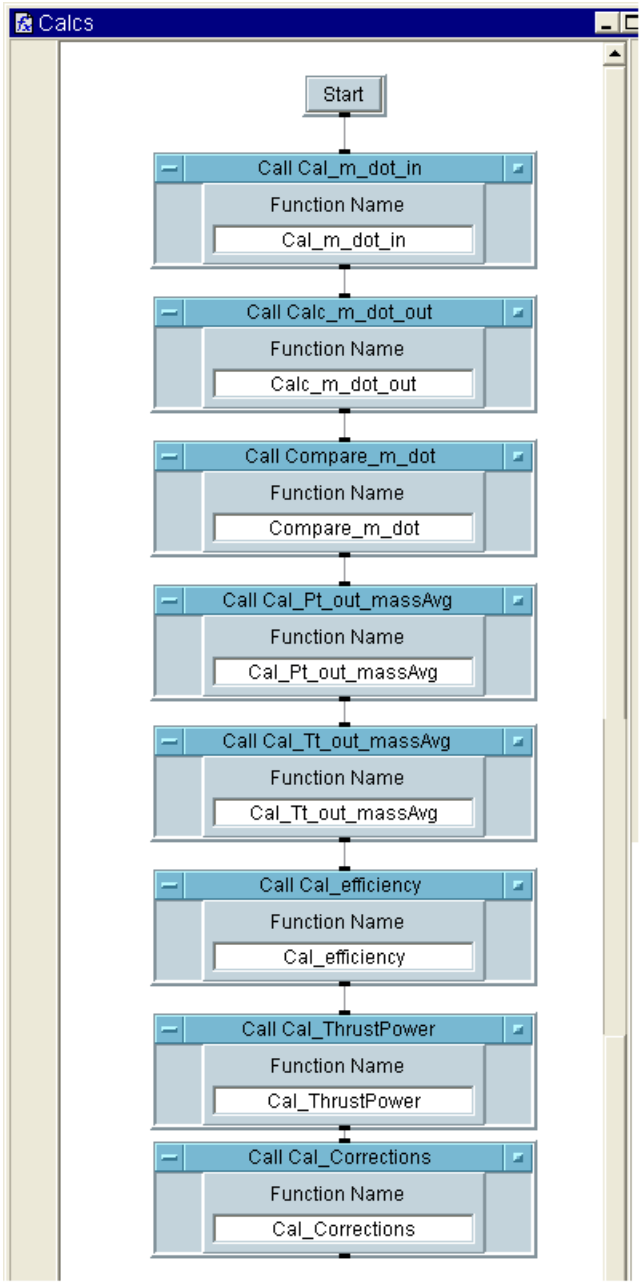

Figure A.09 “Calcs” function, called by “MAIN”

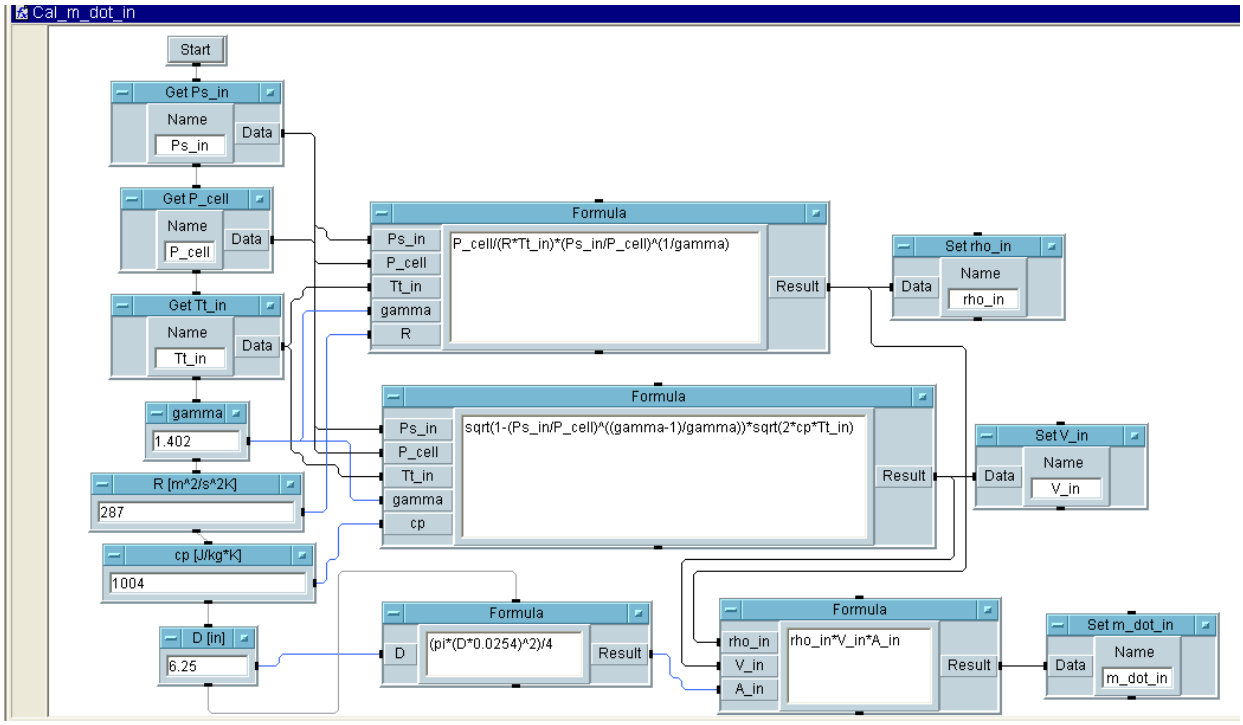

Figure A.10 “Cal_m_dot_in” function, called by “Calcs”

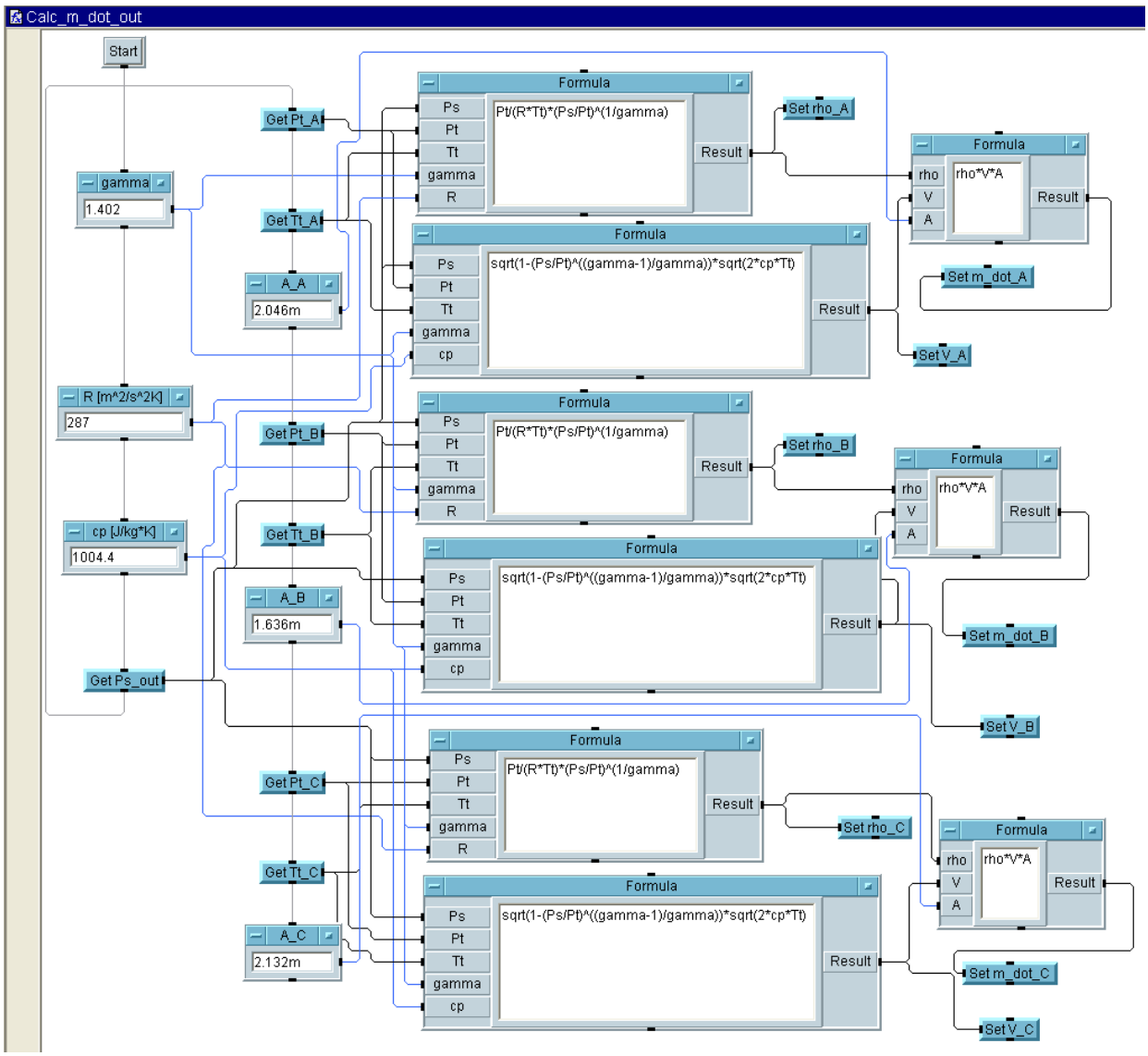

Figure A.11 “Cal_m_dot_out” function, called by “Calcs”

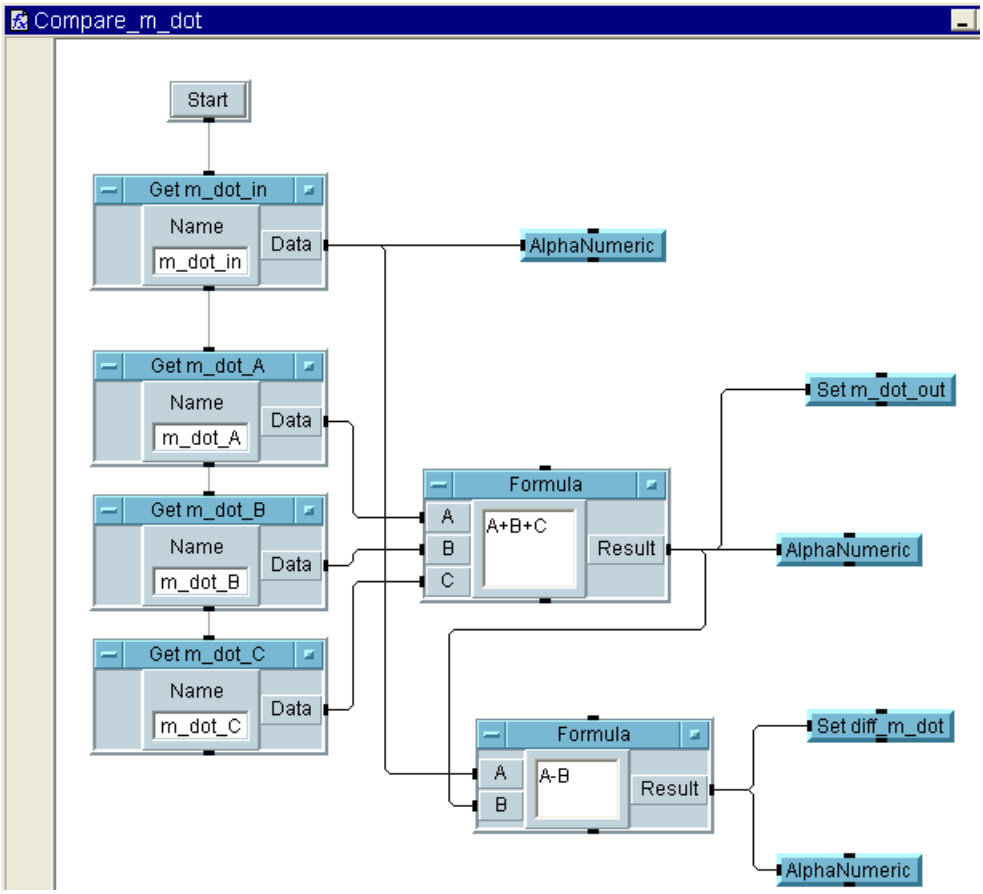

Figure A.12 "Compare_m_dot" function, called by "Calcs"

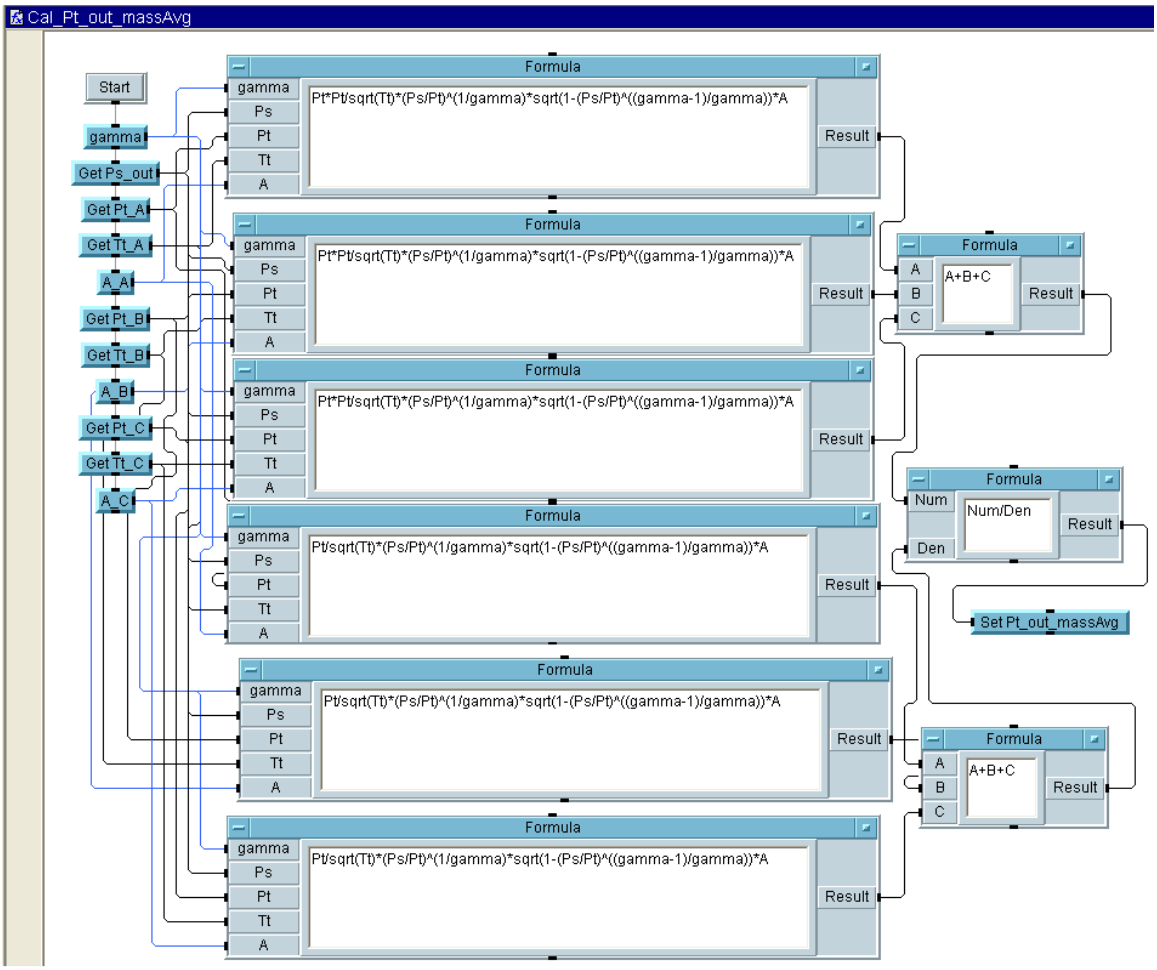

Figure A.13 “Cal_Pt_out_massAvg” function, called by “Calcs”

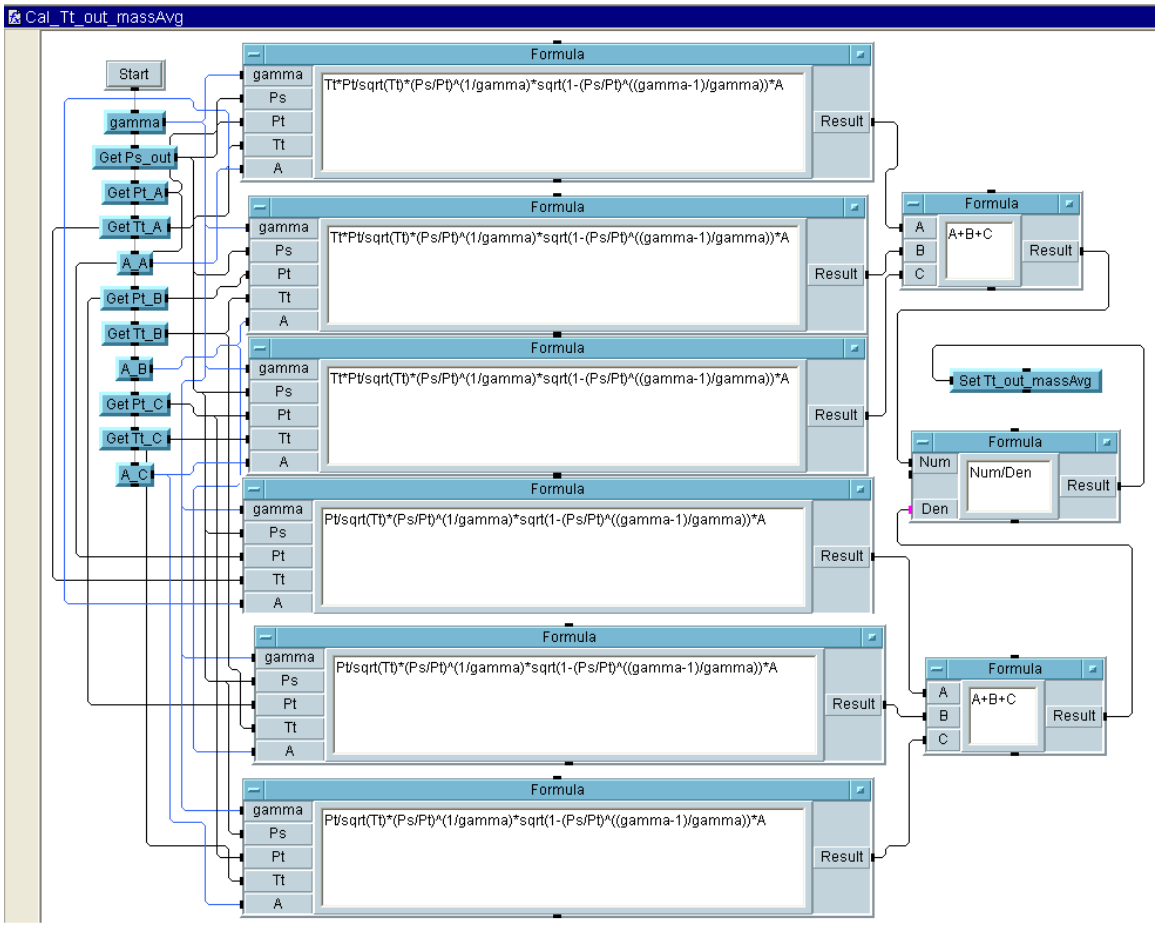

Figure A.14 "Cal_Tt_out_massAvg" function, called by "Calcs"

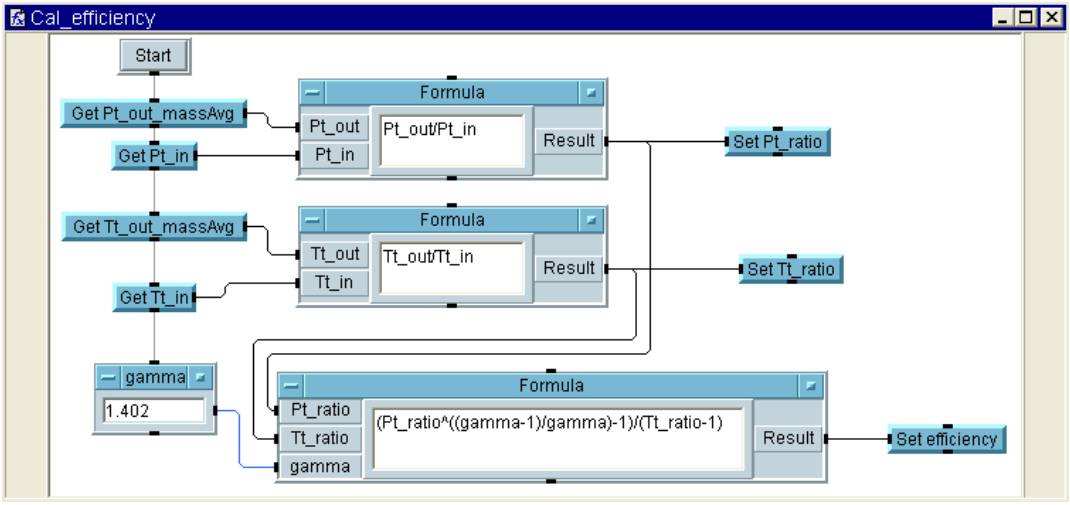

Figure A.15 "Cal_efficiency" function, called by "Calcs"

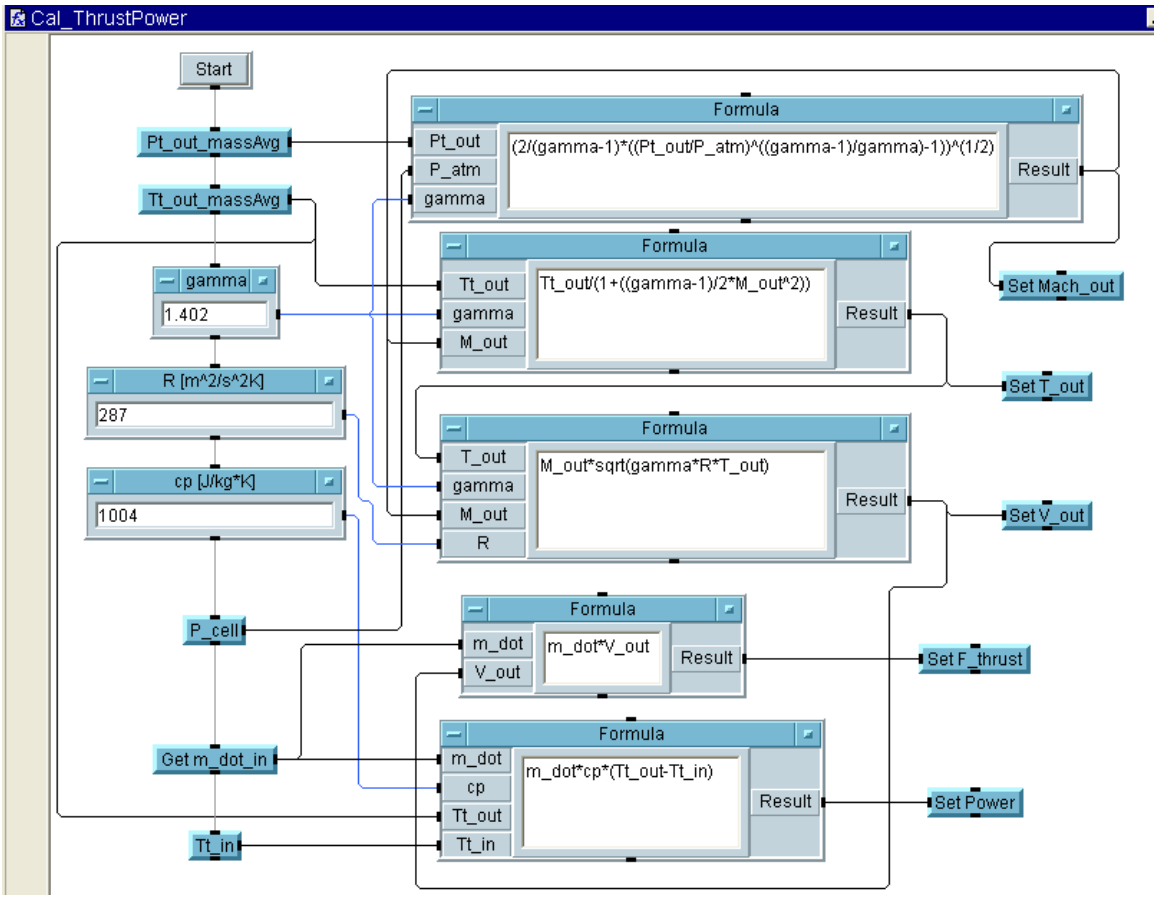

Figure A.16 "Cal_ThrustPower" function, called by "Calcs"

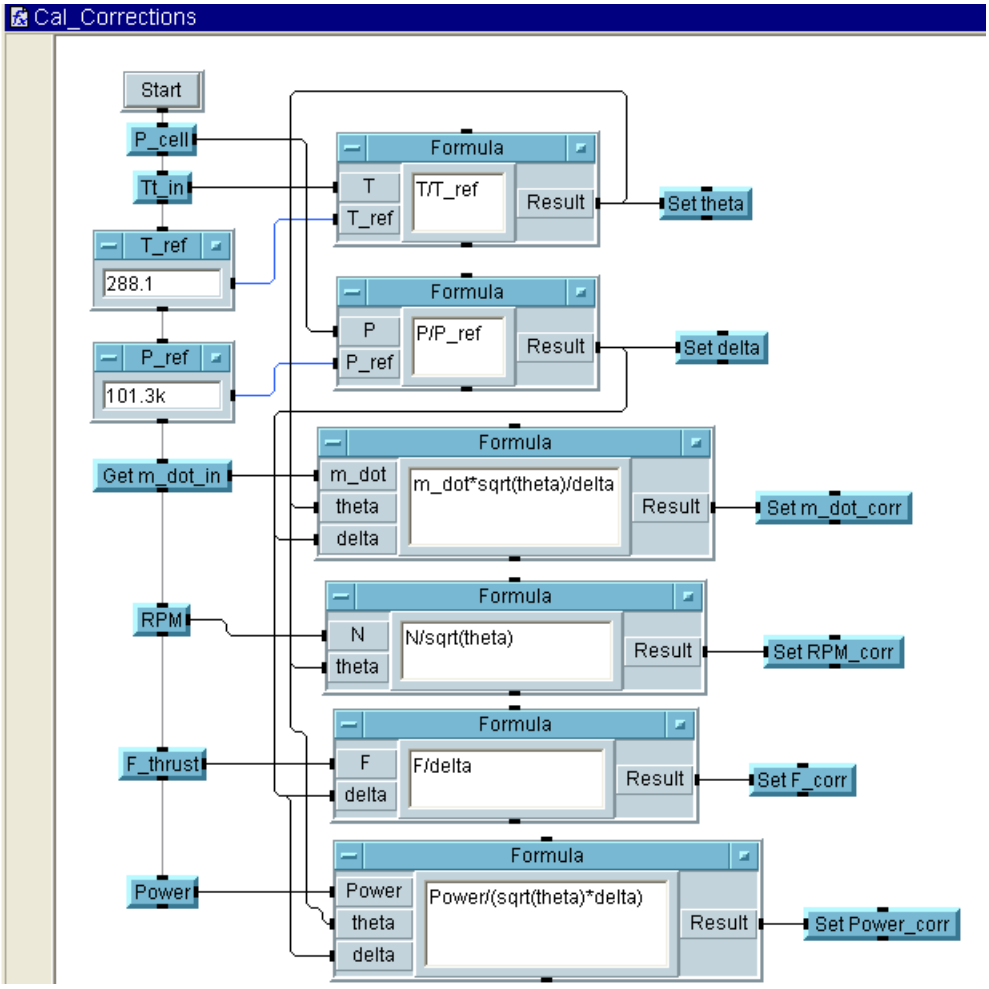

Figure A.17 "Cal_Corrections" function, called by "Calcs"

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APPENDIX B. 6 IN DIAMETER, 4 IN SPAN RAW DATA

The experimental raw data for the 6 D 4L CFF is shown below. An average of the raw data is shown below each set of test points labeled with the speed and notch setting, i.e. “5000 – 0” for 5000 RPM and notch setting 0. Note that the average raw data was not used for calculations but instead calculated values were averaged for each data point.

Date	Run	RPM	P_cell	Ps_in	Pt_in	Ps_out	Pt_A	Pt_B	Pt_C	Tt_10	Tt_12	Tt_2	Tt_A	Tt_B	Tt_C
19-Mar-08	17	5024.50	101733.98	101303.91	101285.32	100165.23	105405.68	106774.66	106789.08	290.50	290.22	290.44	293.88	295.02	297.36
19-Mar-08	18	5023.99	101733.98	101298.40	101279.84	100154.26	105285.30	106732.17	106756.15	290.45	290.20	290.36	293.82	295.04	297.31
19-Mar-08	19	5038.17	101733.98	101309.43	101279.84	100154.26	105378.32	106742.79	106805.55	290.64	290.28	290.47	293.99	295.20	297.63
19-Mar-08	20	5032.42	101733.98	101309.43	101290.79	100165.23	105438.51	106732.17	106772.62	290.70	290.27	290.48	293.88	295.19	297.57
19-Mar-08	21	5039.35	101733.98	101309.43	101268.90	100159.75	105367.37	106684.37	106745.18	290.37	290.11	290.39	293.74	294.77	297.04
19-Mar-08	5000 - 0	5031.68	101733.98	101306.12	101280.94	100159.75	105375.03	106733.23	106773.72	290.53	290.21	290.43	293.86	295.04	297.38
19-Mar-08	22	5036.81	101728.46	101320.46	101290.80	100346.25	105350.96	106711.74	106701.15	290.97	290.52	290.76	294.20	295.42	297.84
19-Mar-08	23	5028.03	101728.46	101314.95	101296.28	100335.28	105356.43	106738.30	106728.60	290.84	290.45	290.69	294.21	295.23	297.64
19-Mar-08	24	5036.98	101728.46	101314.95	101279.86	100329.80	105246.99	106727.67	106717.62	290.81	290.55	290.70	294.27	295.35	297.78
19-Mar-08	25	5033.77	101733.98	101314.95	101296.28	100346.25	105378.32	106722.36	106723.11	291.17	291.03	290.79	294.63	295.79	298.14
19-Mar-08	26	5028.37	101728.46	101314.95	101301.75	100340.77	105443.98	106748.92	106767.02	290.98	290.59	290.72	294.15	295.29	297.75
19-Mar-08	5000 - 1	5032.79	101729.56	101316.05	101292.99	100339.67	105355.34	106729.80	106727.50	290.95	290.63	290.73	294.29	295.42	297.83
19-Mar-08	27	5026.18	101733.98	101397.66	101372.89	101410.43	105400.12	106552.38	106251.10	290.97	290.75	290.94	294.41	295.39	297.17
19-Mar-08	28	5024.33	101733.98	101392.15	101361.95	101377.52	105345.40	106515.19	106256.58	290.99	290.53	291.00	294.28	295.27	297.12
19-Mar-08	29	5020.63	101733.98	101392.15	101367.42	101393.98	105323.52	106578.94	106267.56	290.98	290.72	290.95	294.43	295.32	297.06
19-Mar-08	30	5034.45	101733.98	101403.17	101372.89	101399.46	105367.29	106563.00	106289.52	291.06	290.98	290.90	294.55	295.51	297.26
19-Mar-08	31	5020.46	101733.98	101397.66	101372.89	101377.52	105279.74	106578.94	106284.03	291.08	290.70	290.93	294.49	295.47	297.39
19-Mar-08	5000 - 2	5025.21	101733.98	101396.56	101369.61	101391.78	105343.22	106557.69	106269.76	291.02	290.74	290.94	294.43	295.39	297.20
19-Mar-08	32	5021.97	101733.98	101469.34	101454.98	102286.94	105427.48	106345.21	105790.06	291.16	290.90	291.24	294.49	295.11	296.43
19-Mar-08	33	5019.12	101733.98	101474.85	101454.98	102292.41	105356.35	106334.59	105839.46	291.19	290.98	291.23	294.56	295.29	296.56
19-Mar-08	34	5023.99	101733.98	101474.85	101465.93	102297.88	105361.82	106345.21	105806.53	291.13	290.76	291.16	294.42	295.03	296.29
19-Mar-08	35	5032.76	101728.46	101480.37	101465.93	102292.41	105356.35	106308.03	105806.53	291.05	290.79	291.09	294.37	295.00	296.29
19-Mar-08	36	5021.13	101733.98	101474.85	101454.98	102303.36	105394.65	106329.27	105844.95	291.24	291.24	291.17	294.81	295.44	296.53
19-Mar-08	5000 - 2 1/2	5023.79	101732.88	101474.85	101459.36	102294.60	105379.33	106332.46	105817.50	291.15	290.93	291.18	294.53	295.17	296.42
19-Mar-08	37	5033.43	101733.98	101563.08	101509.71	103157.27	105159.37	105909.63	105356.47	291.85	292.00	291.94	295.35	295.69	296.05
19-Mar-08	38	5017.94	101733.98	101563.08	101515.18	103162.74	105115.59	105914.94	105323.54	291.93	292.06	291.94	295.41	295.83	296.18
19-Mar-08	39	5019.79	101733.98	101563.08	101509.71	103168.22	105022.57	105856.51	105350.98	291.91	292.03	291.89	295.42	295.81	296.11
19-Mar-08	40	5005.55	101733.98	101574.10	101515.18	103168.22	105126.54	105893.69	105257.68	291.93	292.01	291.90	295.42	295.84	296.15
19-Mar-08	41	5020.29	101733.98	101563.08	101509.71	103168.22	105104.65	105877.76	105340.00	291.72	291.72	291.85	295.16	295.51	295.90
19-Mar-08	42	5026.52	101733.98	101563.08	101504.24	103168.22	105055.40	105845.88	105345.49	292.01	292.14	291.98	295.51	295.93	296.26
19-Mar-08	5000 -3	5020.59	101733.98	101564.91	101510.62	103165.48	105097.35	105883.07	105329.03	291.89	291.99	291.92	295.38	295.77	296.11
19-Mar-08	44	5021.13	101733.98	101618.21	101580.85	103430.96	104584.84	105118.14	104983.25	291.28	291.27	291.78	294.52	294.59	294.91
19-Mar-08	45	5023.49	101739.51	101618.21	101575.38	103436.43	104601.25	105112.83	104983.25	291.34	291.32	291.77	294.60	294.64	294.94
19-Mar-08	46	5017.60	101739.51	101618.21	101575.38	103430.96	104628.61	105128.77	104961.30	291.46	291.51	291.78	294.71	294.80	295.01
19-Mar-08	47	5028.03	101733.98	101623.73	101575.38	103441.91	104639.56	105118.14	104961.30	291.42	291.48	291.77	294.76	294.87	295.04
19-Mar-08	48	5025.51	101733.98	101623.73	101575.38	103430.96	104601.25	105155.33	104966.79	291.48	291.49	291.73	294.74	294.85	295.08
19-Mar-08	5000 -3 1/3	5023.15	101736.19	101620.42	101576.47	103434.24	104611.10	105126.64	104971.18	291.40	291.42	291.77	294.67	294.75	295.00
19-Mar-08	49	5047.15	101728.46	101695.41	101684.84	103140.85	103764.09	103736.98	103622.06	291.77	291.84	291.96	295.29	295.52	295.92
19-Mar-08	50	5027.53	101728.46	101695.41	101673.89	103140.85	103747.67	103678.55	103622.06	291.67	291.53	291.95	295.15	295.39	295.81
19-Mar-08	51	5035.97	101728.46	101689.90	101679.36	103157.27	103742.20	103705.11	103633.04	291.70	291.68	291.93	295.23	295.47	295.89
19-Mar-08	52	5029.04	101728.46	101689.90	101673.89	103157.27	103758.61	103705.11	103622.06	291.73	291.79	291.94	295.32	295.57	295.96
19-Mar-08	53	5036.47	101728.46	101689.90	101679.36	103162.74	103769.56	103742.29	103665.97	291.78	291.83	291.95	295.35	295.59	295.96
19-Mar-08	5000 -3 2/3	5035.23	101728.46	101692.10	101678.27	103151.80	103756.43	103713.61	103633.04	291.73	291.73	291.95	295.27	295.51	295.91
19-Mar-08	75	5531.64	101733.98	101221.23	101192.31	99814.28	105974.55	107779.31	107919.46	290.94	290.36	291.23	294.95	296.32	299.33
19-Mar-08	76	5520.24	101733.98	101215.72	101186.84	99819.76	106012.85	107768.68	107930.44	291.02	290.64	291.22	295.13	296.33	299.34
19-Mar-08	77	5512.33	101733.98	101221.23	101186.84	99819.76	106067.57	107858.98	107990.81	290.92	290.58	291.21	295.22	296.56	299.54
19-Mar-08	78	5515.16	101733.98	101226.75	101192.31	99830.73	106078.51	107789.93	107913.97	290.91	290.58	291.22	295.25	296.54	299.43
19-Mar-08	79	5527.76	101733.98	101221.23	101192.31	99841.70	106018.32	107747.44	107886.53	290.98	290.79	291.17	295.40	296.72	299.52
19-Mar-08	5500 -0	5521.43	101733.98	101221.23	101190.12	99825.25	106030.36	107788.87	107928.24	290.95	290.59	291.21	295.19	296.50	299.43
19-Mar-08	70	5521.86	101733.98	101237.77	101208.73	100077.56	106067.57	107874.92	107902.99	290.94	290.76	291.33	295.41	296.66	299.34
19-Mar-08	71	5523.49	101728.46	101232.26	101203.26	100072.08	106056.62	107736.81	107859.09	291.13	290.73	291.44	295.41	296.68	299.49
19-Mar-08	72	5539.81	101733.98	101232.26	101230.62	100083.05	106105.87	107848.36	107892.02	291.21	290.82	291.44	295.47	296.84	299.67
19-Mar-08	73	5536.13	101733.98	101237.77	101208.73	100066.59	106012.85	107795.24	107875.55	291.23	290.83	291.39	295.56	296.86	299.67
19-Mar-08	74	5534.09	101728.46	101237.77	101208.73	100072.08	106023.80	107768.68	107837.13	291.16	290.90	291.38	295.38	296.70	299.60
19-Mar-08	5500 -1	5531.08	101731.77	101235.57	101212.01	100074.27	106053.34	107804.80	107873.36	291.14	290.81	291.40	295.44	296.75	299.55
19-Mar-08	64	5536.54	101733.98	101325.99	101301.76	101306.22	106040.21	107550.90	107321.23	291.45	291.36	291.50	295.90	296.93	299.05
19-Mar-08	65	5532.25	101728.46	101331.51	101296.29	101355.59	106045.68	107561.52	107271.83	291.47	291.33	291.54	295.81	296.87	299.01
19-Mar-08	66	5530.41	101733.98	101331.51	101296.29	101339.13	105980.02	107550.90	107310.25	291.06	290.82	291.35	295.25	296.18	298.39
19-Mar-08	67	5526.75	101728.46	101331.51	101307.23	101366.56	106040.21	107545.59	107277.32	291.13	291.00	291.33	295.57	296.55	298.76
19-Mar-08	68	5519.22	101733.98	101325.99	101296.29	101317.19	105969.08	107513.71	107321.23	291.41	291.36	291.34	295.88	296.91	299.01
19-Mar-08	69	5522.27	101733.98	101320.48	101301.76	101317.19	106105.87	107513.71	107238.90	291.49	291.36	291.41	295.88	296.91	299.01
19-Mar-08	5500 -2	5527.91	101732.14	101327.83	101299.94	101333.65	106030.18	107539.39	107290.12	291.34	291.21	291.41	295.71	296.72	298.87
19-Mar-08	59	5525.52	101733.98	101408.70	101378.38	102248.51	106094.93	107349.05	106827.27	290.89	290.69	291.24	295.15	295.77	297.37
19-Mar-08	60	5509.29	101733.98	101403.18	101378.38	102253.99	106089.45	107322.49	106838.25	290.76	290.74	291.22	295.12	295.74	297.34
19-Mar-08	61	5523.49	101728.46	101408.70	101383.85	102264.93	106198.89	107343.73	106832.76	290.80	290.85	291.15	295.26	295.95	297.60
19-Mar-08	62	5538.79	101733.98	101408.70	101389.32	102253.99	106138.70	107343.73	106827.27	291.10	291.07	291.25	295.42	296.15	297.73
19-Mar-08	63	5524.51	101728.46	101403.18	101383.85	102264.93	106056.62	107322.49	106843.74	291.11	291.04	291.20	295.33	296.11	297.73
19-Mar-08	5500 -2 1/2	5524.32	101731.77	101406.49	101382.75	102257.27	106115.72	107336.30	106833.86	290.93	290.88	291.21	295.26	295.95	297.56

Table B.01 6D 4L Raw Data, Page 1

Date	Run	RPM	P_cell	Ps_in	Pt_in	Ps_out	Pt_A	Pt_B	Pt_C	Tt_10	Tt_12	Tt_2	Tt_A	Tt_B	Tt_C
19-Mar-08	54	5543.90	101733.98	101513.46	101498.77	103430.60	105870.59	106924.10	106229.04	291.81	291.85	291.95	296.05	296.58	297.07
19-Mar-08	55	5545.34	101728.46	101518.97	101498.77	103457.96	105980.02	106918.79	106223.55	291.87	291.93	291.96	296.11	296.65	297.16
19-Mar-08	56	5543.29	101728.46	101524.49	101509.72	103447.01	105826.82	106902.85	106196.11	291.93	292.06	292.02	296.19	296.74	297.21
19-Mar-08	57	5534.09	101733.98	101518.97	101509.72	103425.12	105804.93	106844.42	106163.18	291.99	292.17	292.02	296.27	296.80	297.27
19-Mar-08	58	5516.79	101728.46	101518.97	101504.24	103436.07	105826.82	106849.73	106168.67	291.99	292.12	291.98	296.21	296.72	297.19
19-Mar-08	5500 - 3	5536.68	101730.67	101518.97	101504.24	103439.35	105861.84	106887.98	106196.11	291.92	292.02	291.99	296.16	296.70	297.18
19-Mar-08	80	5547.39	101728.46	101518.98	101498.78	103496.27	105908.80	106807.12	106179.54	291.41	291.54	291.72	295.71	296.12	296.60
19-Mar-08	81	5533.68	101728.46	101524.49	101476.89	103490.80	105799.37	106780.56	106157.59	291.40	291.45	291.70	295.66	296.08	296.57
19-Mar-08	82	5527.97	101728.46	101530.00	101509.72	103496.27	105793.90	106796.50	106206.98	291.41	291.58	291.66	295.77	296.20	296.61
19-Mar-08	83	5530.62	101728.46	101530.00	101515.19	103512.69	105843.14	106769.94	106135.64	291.45	291.60	291.68	295.78	296.23	296.64
19-Mar-08	84	5539.81	101733.98	101524.49	101476.89	103512.69	105728.24	106796.50	106190.52	291.53	291.68	291.72	295.86	296.28	296.71
19-Mar-08	5500 - 3	5535.89	101729.56	101525.59	101495.49	103501.74	105814.69	106790.12	106174.05	291.44	291.57	291.69	295.76	296.18	296.63
19-Mar-08	85	5514.35	101728.46	101590.65	101531.61	103780.80	105279.58	105973.18	105702.06	291.40	291.44	291.87	295.47	295.63	295.95
19-Mar-08	86	5507.27	101733.98	101590.65	101542.56	103780.80	105301.47	106052.85	105652.67	291.49	291.59	291.88	295.59	295.79	296.06
19-Mar-08	87	5524.91	101728.46	101585.14	101537.08	103797.21	105372.60	106116.59	105669.13	291.59	291.72	291.88	295.64	295.89	296.11
19-Mar-08	88	5513.14	101728.46	101590.65	101537.08	103786.27	105257.70	105941.31	105702.06	291.60	291.72	291.91	295.67	295.86	296.11
19-Mar-08	89	5514.15	101728.46	101590.65	101537.08	103797.21	105197.51	105893.50	105713.04	291.46	291.52	291.86	295.47	295.66	295.97
19-Mar-08	5500 - 3 1/3	5514.76	101729.56	101589.55	101537.08	103788.46	105281.77	105995.49	105687.79	291.51	291.60	291.88	295.57	295.77	296.04
19-Mar-08	90	5529.39	101733.98	101684.38	101668.42	103490.76	104201.71	104151.25	104061.08	292.08	292.28	292.27	296.49	296.79	297.23
19-Mar-08	91	5529.39	101733.98	101684.38	101662.95	103507.17	104201.71	104124.69	104061.08	292.08	292.22	292.25	296.44	296.76	297.16
19-Mar-08	92	5509.49	101733.98	101684.38	101662.95	103446.98	104196.24	104119.38	104044.61	292.08	292.26	292.27	296.48	296.76	297.19
19-Mar-08	93	5530.62	101728.46	101684.38	101662.95	103452.45	104168.88	104135.32	104066.56	292.07	292.23	292.30	296.44	296.71	297.15
19-Mar-08	94	5524.71	101728.46	101684.38	101668.42	103501.70	104196.24	104161.87	104126.93	292.10	292.22	292.29	296.42	296.73	297.18
19-Mar-08	5500 - 3 2/3	5524.72	101731.77	101684.38	101665.14	103479.81	104192.95	104138.50	104072.05	292.08	292.24	292.28	296.45	296.75	297.18
19-Mar-08	95	6032.12	101733.98	101160.60	101071.93	99429.94	106838.94	109101.79	109247.47	290.90	290.76	291.34	296.37	297.99	301.43
19-Mar-08	96	6036.86	101733.98	101166.11	101077.41	99435.43	107024.97	109176.16	109280.41	291.04	290.64	291.44	296.07	297.71	301.42
19-Mar-08	97	6029.82	101728.46	101171.63	101044.57	99462.86	106986.67	109006.18	109187.10	290.99	290.81	291.33	296.24	297.68	301.31
19-Mar-08	98	6042.33	101733.98	101171.63	101039.10	99440.91	107030.44	109091.17	109269.43	291.02	290.66	291.29	296.17	297.74	301.32
19-Mar-08	99	6044.52	101733.98	101166.11	101055.52	99435.43	106871.77	109069.92	109252.96	290.86	290.70	291.32	296.28	297.86	301.19
19-Mar-08	6000 - 0	6037.13	101732.88	101167.21	101057.71	99440.91	106950.56	109089.04	109247.48	290.96	290.71	291.34	296.23	297.79	301.33
19-Mar-08	100	6031.39	101733.98	101193.68	101082.88	99726.18	106849.88	109059.30	109110.27	291.78	291.47	291.96	296.71	298.38	301.87
19-Mar-08	101	6040.99	101733.98	101182.65	101088.35	99726.18	107035.91	109091.17	109165.15	291.65	291.35	291.91	296.90	298.57	302.01
19-Mar-08	102	6027.64	101733.98	101193.68	101077.41	99709.73	106931.96	109032.74	109066.36	291.89	291.86	291.99	297.26	298.91	302.22
19-Mar-08	103	6039.16	101733.98	101204.71	101066.46	99715.21	106888.18	109000.87	109099.29	291.88	291.78	292.03	297.25	298.84	302.16
19-Mar-08	104	6028.61	101733.98	101182.65	101055.52	99748.13	106811.58	108899.95	109060.87	291.94	291.85	292.07	297.28	298.92	302.08
19-Mar-08	6000 - 1	6033.56	101733.98	101191.47	101074.12	99725.09	106903.50	109016.80	109100.39	291.83	291.66	291.99	297.08	298.72	302.07
19-Mar-08	105	6042.33	101733.98	101276.38	101214.22	101212.89	106970.26	108830.89	108495.58	291.40	291.03	291.66	296.53	297.70	300.48
19-Mar-08	106	6040.99	101733.98	101276.38	101192.33	101212.89	106800.64	108793.71	108479.12	291.28	291.09	291.66	296.57	297.69	300.36
19-Mar-08	107	6053.42	101733.98	101281.90	101186.85	101185.46	107139.87	108862.76	108495.58	291.56	291.33	291.77	296.69	297.86	300.53
19-Mar-08	108	6036.98	101733.98	101292.92	101203.27	101218.38	106942.90	108825.58	108512.05	291.41	291.34	291.70	296.82	297.96	300.49
19-Mar-08	109	6043.18	101733.98	101276.38	101192.33	101196.43	107030.44	108799.02	108413.26	291.43	291.19	291.65	296.69	297.90	300.59
19-Mar-08	6000 - 2	6043.38	101733.98	101280.79	101197.80	101205.21	106976.82	108822.39	108479.12	291.42	291.20	291.69	296.66	297.82	300.49
19-Mar-08	110	6047.56	101733.98	101381.14	101301.77	102401.73	107123.46	108522.81	107771.14	291.97	291.81	292.15	297.21	298.27	300.10
19-Mar-08	111	6039.41	101733.98	101381.14	101296.30	102418.15	107030.44	108528.12	107809.55	292.05	291.90	292.19	297.27	298.35	300.15
19-Mar-08	112	6049.76	101733.98	101386.65	101285.36	102407.20	106964.78	108459.07	107776.62	292.11	291.93	292.25	297.31	298.35	300.18
19-Mar-08	113	6055.74	101733.98	101364.60	101296.30	102423.62	106942.90	108533.44	107809.55	292.12	292.01	292.25	297.36	298.44	300.24
19-Mar-08	114	6053.91	101733.98	101364.60	101285.36	102429.09	106959.31	108538.75	107831.51	292.14	292.05	292.26	297.40	298.44	300.21
19-Mar-08	6000 - 2 1/2	6049.28	101733.98	101375.63	101293.02	102415.96	107004.18	108516.44	107799.67	292.08	291.94	292.22	297.31	298.37	300.18
19-Mar-08	115	6036.73	101733.98	101485.90	101433.11	103726.07	106724.04	107954.46	107205.85	292.36	292.41	292.66	297.50	298.17	298.95
19-Mar-08	116	6038.92	101728.46	101485.90	101438.58	103726.07	106685.74	107890.72	107134.50	292.43	292.44	292.66	297.54	298.24	299.00
19-Mar-08	117	6032.61	101733.98	101496.92	101422.16	103737.02	106729.51	107970.39	107150.96	292.44	292.43	292.64	297.51	298.22	298.98
19-Mar-08	118	6034.31	101733.98	101496.92	101438.58	103709.65	106734.98	107954.46	107139.99	292.38	292.39	292.67	297.39	297.99	298.81
19-Mar-08	119	6027.15	101733.98	101491.41	101444.05	103709.65	106702.16	107885.40	107167.43	292.43	292.48	292.64	297.53	298.27	298.98
19-Mar-08	120	6029.82	101733.98	101491.41	101433.11	103715.13	106811.58	107991.64	107101.57	292.48	292.58	292.63	297.63	298.31	299.04
19-Mar-08	6000 - 3	6033.26	101733.06	101491.41	101434.93	103720.60	106731.34	107941.18	107150.05	292.42	292.45	292.65	297.52	298.20	298.96
19-Mar-08	121	6036.37	101733.98	101563.09	101476.89	104158.40	106220.67	107189.57	106563.72	292.72	292.86	292.94	297.62	298.03	298.33
19-Mar-08	122	6052.81	101733.98	101557.57	101476.89	104163.87	106330.10	107332.98	106563.72	292.76	292.90	292.96	297.63	298.03	298.30
19-Mar-08	123	6061.98	101733.98	101563.09	101471.42	104169.34	106248.03	107147.07	106563.72	292.74	292.90	292.92	297.67	298.05	298.34
19-Mar-08	124	6064.56	101728.46	101557.57	101476.89	104185.76	106198.78	107147.07	106618.60	292.75	292.89	292.97	297.69	298.07	298.38
19-Mar-08	125	6062.96	101733.98	101563.09	101471.42	104163.87	106182.37	107120.51	106580.18	292.75	292.90	292.97	297.65	298.02	298.32
19-Mar-08	126	6059.17	101728.46	101557.57	101471.42	104174.82	106258.97	107173.63	106536.28	292.80	292.94	292.99	297.69	298.07	298.39
19-Mar-08	6000 - 3 1/3	6056.31	101732.14	101560.33	101474.15	104169.34	106239.82	107185.14	106571.04	292.76	292.90	292.96	297.66	298.04	298.34
19-Mar-08	127	6039.89	101728.46	101678.87	101652.00	103791.74	104672.25	104597.44	104516.60	292.53	292.48	292.92	297.56	297.90	298.47
19-Mar-08	128	6042.94	101733.98	101678.87	101646.53	103835.52	104721.49	104650.55	104533.07	292.55	292.56	292.91	297.62	297.96	298.52
19-Mar-08	129	6044.52	101739.51	101684.38	101652.00	103819.10	104705.08	104645.24	104544.04	292.47	292.46	292.90	297.53	297.89	298.46
19-Mar-08	130	6047.20	101733.98	101678.87	101652.00	103857.41	104710.55	104639.93	104549.53	292.53	292.57	292.91	297.64	298.00	298.54
19-Mar-08	131	6051.35	101733.98	101678.87	101652.00	103824.58	104721.49	104714.30	104598.92	292.62	292.70	292.92	297.75	298.10	298.65
19-Mar-08	6000 - 3 2/3	6045.18	101733.98	101679.97	101650.91	103825.67	104706.17	104649.49	104548.43	292.54	292.56	292.91	297.62	297.97	298.53
17-Mar-08	1	3490.42	101705.75	101496.24	101437.65	100965.17	103489.49	104043.12	104049.27	289.12	288.90	288.84	290.85	291.49	292.60
17-Mar-08	2	3494.41	101711.27	101507.27	101426.71	100970.66	103429.30	103990.01	104071.22	289.15	289.16	288.86	291.16	291.71	292.64
17-Mar-08	3	3495.38	101705.75	101507.27	101426.71	100981.63	103412.89	104000.63	104021.82	289.31	289.27	288.89	291.19	291.78	292.82
17-Mar-08	4	3500.60	101711.27	101501.76	101426.71	100970.66	103544.20	104037.81	104054.75	289.33	289.32	288.93	291.27	291.84	292.83
17-Mar-08	5	3499.62	101705.75	101501.76	101432.18	100970.66	103434.77	104016.56	104093.17	289.29	289.15	288.94	291.19	291.74	292.81
17-Mar-08	3500 - 0	3496.09	101707.95	101502.86	101429.99	100971.76	103462.13	104017.63	104058.05	289.24	289.16	288.89	291.13	291.71	292.74
17-Mar-08	6	3502.16	101705.75	101507.27	101432.19	101080.38	103418.32	103994.84	104015.84	289.55	289.44	289.42	291.48	291.99	292.93
17-Mar-08	7	3506.25	101705.75	101507.27	101437.66	101074.89	103473.07	104021.39	103999.38	289.61	289.31	289.41	291.27	291.85	292.99
17-Mar-08	8	3509.86	101705.75	101501.76	101443.13	101074.89	103489.49	104026.70	104010.35	289.57	289.29	289.37	291.28	291.81	292.99
17-Mar-08	9	3507.07	101700.22	101501.76	101443.13	101069.41	103451.15	104074.50	104059.74	289.52	289.28	289.36	291.33	291.89	292.94
17-Mar-08	10	3508.71	101700.22	101507.27	101437.66	101069.41	103478.50	104021.39	104015.84	289.71	289.57	289.42	291.51	292.07	293.10
17-Mar-08	3500 - 1	3506.81	101703.54	101505.07	101438.75	101073.80	103462.11	104027.77	104020.23	289.59	289.38	289.40	291.37	291.92	292.99
17-Mar-08	11	3510.44	101700.22	101551.38	101486.91	101585.09	103380.02	103909.87	103785.38	290.40	290.53	290.14	292.40	292.82	293.49
17-Mar-08	12	3505.68	101705.75	101551.38	101492.38	101601.55	103434.73	103931.11	103801.84	290.36	290.35	290.15	292.26	292.66	293.36
17-Mar-08	13	3518.50	101705.75	101551.38	101492.38	101612.52	103489.45	103936.42	103796.36	290.25	290.30	290.07	292.22	292.61	293.27
17-Mar-08	14	3519.83	101705.75	101551.38	101486.91	101607.04	103489.45	103941.73	103796.36	290.14	290.21	290.08	292.12	292.48	293.12
17-Mar-08	15	3509.61	101705.75	101551.38	101492.38	101590.58	103456.62	103941.73	103768.92	290.24	290.27	290.11	292.24	292.65	293.34
17-Mar-08	3500 - 2	3512.81	101704.64	101551.38	101490.19	101599.36	103450.05	103932.18	103789.77	290.28	290.33	290.11	292.25	292.64	293.32

Table B.02 6D 4L Raw Data, Page 2

Date	Run	RPM	P_cell	Ps_in	Pt_in	Ps_out	Pt_A	Pt_B	Pt_C	Tt_10	Tt_12	Tt_2	Tt_A	Tt_B	Tt_C
17-Mar-08	16	3522.55	101705.75	101589.98	101536.16	101990.31	103440.20	103846.14	103565.90	290.13	290.04	289.99	292.01	292.32	292.78
17-Mar-08	17	3524.62	101700.22	101584.46	101536.16	102001.25	103440.20	103878.01	103593.34	290.13	290.12	290.01	292.14	292.42	292.79
17-Mar-08	18	3520.07	101705.75	101589.98	101541.63	102001.25	103434.73	103888.63	103587.85	290.25	290.29	290.05	292.24	292.52	292.92
17-Mar-08	19	3523.88	101705.75	101584.46	101541.63	101990.31	103473.03	103888.63	103582.36	290.23	290.27	290.02	292.26	292.53	292.92
17-Mar-08	20	3517.76	101705.75	101584.46	101541.63	101995.78	103445.68	103867.39	103609.80	290.27	290.31	290.07	292.27	292.57	292.97
17-Mar-08	3500 - 2 1/2	3521.78	101704.64	101586.67	101539.44	101995.78	103446.77	103873.76	103587.85	290.20	290.20	290.03	292.18	292.47	292.88
17-Mar-08	21	3519.00	101705.75	101634.08	101601.83	102417.07	103237.77	103596.54	103368.37	290.42	290.50	290.27	292.34	292.51	292.59
17-Mar-08	22	3520.07	101705.75	101634.08	101601.83	102417.07	103297.95	103644.34	103351.90	290.44	290.51	290.30	292.34	292.50	292.61
17-Mar-08	23	3520.32	101705.75	101634.08	101601.83	102417.07	103270.59	103607.16	103362.88	290.45	290.54	290.31	292.37	292.55	292.63
17-Mar-08	24	3520.49	101705.75	101634.08	101601.83	102417.07	103281.54	103633.72	103368.37	290.46	290.57	290.33	292.41	292.60	292.68
17-Mar-08	25	3519.41	101705.75	101634.08	101601.83	102422.54	103243.24	103591.23	103357.39	290.51	290.58	290.40	292.43	292.61	292.68
17-Mar-08	3500 -3	3519.86	101705.75	101634.08	101601.83	102418.16	103266.22	103614.60	103361.78	290.46	290.54	290.32	292.38	292.55	292.64
17-Mar-08	26	3511.59	101700.22	101667.16	101645.60	102389.71	102882.13	103012.37	102896.48	290.63	290.69	290.69	292.31	292.41	292.66
17-Mar-08	27	3510.93	101705.75	101672.68	101645.60	102400.65	102920.43	103060.17	102907.45	290.60	290.70	290.70	292.33	292.41	292.66
17-Mar-08	28	3508.14	101711.27	101667.16	101645.60	102395.18	102920.43	103076.10	102890.99	290.52	290.45	290.67	292.18	292.20	292.47
17-Mar-08	29	3517.18	101711.27	101667.16	101645.60	102389.71	102925.90	103054.86	102901.96	290.53	290.54	290.67	292.23	292.25	292.52
17-Mar-08	30	3508.87	101705.75	101672.68	101645.60	102395.18	102914.96	103081.41	102907.45	290.52	290.57	290.70	292.24	292.29	292.56
17-Mar-08	3500 -3 1/3	3511.34	101706.85	101669.37	101645.60	102394.09	102912.77	103056.98	102900.87	290.56	290.59	290.69	292.26	292.31	292.58
17-Mar-08	31	3523.71	101705.75	101694.73	101678.44	102438.95	102723.46	102725.60	102715.40	290.05	289.67	290.51	291.88	291.92	292.15
17-Mar-08	32	3522.47	101705.75	101689.22	101678.44	102455.37	102717.99	102720.29	102726.38	290.05	289.80	290.52	292.02	292.08	292.29
17-Mar-08	33	3520.32	101711.27	101694.73	101678.44	102455.37	102723.46	102730.91	102726.38	290.15	289.82	290.51	292.01	292.07	292.28
17-Mar-08	34	3524.13	101705.75	101689.22	101678.44	102455.37	102717.99	102714.98	102726.38	290.15	289.88	290.52	292.06	292.12	292.35
17-Mar-08	35	3526.86	101705.75	101694.73	101678.44	102455.37	102723.46	102720.29	102709.92	290.14	289.93	290.52	292.08	292.16	292.38
17-Mar-08	3500 -3 2/3	3523.50	101706.85	101692.52	101678.44	102452.09	102721.27	102722.41	102720.89	290.11	289.82	290.52	292.01	292.07	292.29
17-Mar-08	36	4017.17	101711.27	101441.11	101344.63	100745.76	103970.92	104780.81	104811.47	291.06	290.98	291.00	293.54	294.22	295.61
17-Mar-08	37	4020.61	101711.27	101441.11	101344.63	100734.79	104107.70	104780.81	104811.47	291.06	291.01	290.97	293.57	294.27	295.69
17-Mar-08	38	4014.69	101711.27	101435.60	101339.16	100718.33	104014.69	104748.95	104811.47	291.04	290.88	290.94	293.43	294.08	295.47
17-Mar-08	39	4016.31	101705.75	101435.60	101361.05	100734.79	104031.11	104839.23	104838.90	290.93	290.67	290.89	293.25	293.91	295.40
17-Mar-08	40	4021.91	101711.27	101441.11	101344.63	100740.27	104020.16	104717.09	104800.49	290.89	290.69	290.90	293.30	293.93	295.37
17-Mar-08	4000 -0	4018.14	101710.16	101438.91	101346.82	100734.79	104028.92	104773.38	104814.76	290.99	290.85	290.94	293.42	294.08	295.51
17-Mar-08	41	4021.04	101705.75	101446.63	101426.72	100849.99	104020.16	104791.44	104778.54	291.00	290.75	291.04	293.44	294.09	295.46
17-Mar-08	42	4026.55	101705.75	101452.14	101404.83	100839.02	103970.92	104738.33	104751.11	291.07	290.97	291.09	293.56	294.20	295.60
17-Mar-08	43	4019.32	101711.27	101446.63	101437.66	100849.99	104063.93	104775.50	104756.60	290.91	290.58	291.01	293.14	293.76	295.27
17-Mar-08	44	4030.66	101711.27	101446.63	101421.24	100844.51	104047.52	104796.75	104800.49	290.78	290.36	290.97	292.97	293.65	295.20
17-Mar-08	45	4028.39	101711.27	101446.63	101426.72	100849.99	104085.82	104780.81	104811.47	290.81	290.48	290.93	293.12	293.76	295.25
17-Mar-08	4000 -1	4025.19	101709.06	101447.73	101423.43	100846.70	104037.67	104776.57	104779.64	290.92	290.63	291.01	293.25	293.89	295.36
17-Mar-08	46	4012.87	101705.75	101501.76	101470.49	101508.29	103987.34	104679.91	104487.73	291.11	290.93	291.18	293.45	293.86	294.91
17-Mar-08	47	4007.72	101711.27	101507.27	101465.04	101524.75	103938.09	104669.29	104493.22	291.01	290.74	291.06	293.37	293.90	295.00
17-Mar-08	48	4017.60	101711.27	101501.76	101470.51	101497.32	104063.93	104679.91	104493.22	291.12	290.93	291.07	293.47	294.03	295.12
17-Mar-08	49	4016.31	101711.27	101501.76	101465.04	101519.26	104069.41	104690.53	104487.73	291.16	290.86	291.15	293.42	293.96	295.11
17-Mar-08	50	4017.27	101705.75	101501.76	101459.57	101513.78	103998.28	104685.22	104454.81	291.13	290.78	291.11	293.42	293.91	295.07
17-Mar-08	4000 -2	4014.35	101709.06	101502.86	101466.13	101512.68	104011.41	104680.97	104483.34	291.11	290.85	291.11	293.42	293.93	295.04
17-Mar-08	51	4013.73	101705.75	101545.87	101470.51	102034.08	104020.16	104616.18	104229.84	291.45	291.25	291.49	293.79	294.22	294.95
17-Mar-08	52	4023.85	101711.27	101545.87	101470.51	102039.55	103959.98	104600.25	104246.30	291.42	291.22	291.47	293.74	294.11	294.83
17-Mar-08	53	4016.95	101711.27	101551.38	101486.91	102045.02	103976.39	104547.92	104251.78	291.36	291.13	291.47	293.77	294.17	294.85
17-Mar-08	54	4012.55	101711.27	101551.38	101470.51	102039.55	103965.45	104594.94	104246.30	291.40	291.40	291.46	293.92	294.33	294.97
17-Mar-08	55	4014.91	101711.27	101551.38	101470.51	102045.02	103987.34	104589.63	104219.08	291.52	291.41	291.47	293.99	294.41	295.06
17-Mar-08	4000 -2 1/2	4016.40	101710.16	101549.18	101473.79	102040.64	103981.86	104589.79	104238.66	291.43	291.28	291.47	293.84	294.25	294.93
17-Mar-08	56	4020.18	101711.27	101617.54	101558.06	102679.69	103719.24	104143.54	104004.87	291.50	291.54	291.57	293.88	294.06	294.30
17-Mar-08	57	4020.83	101694.70	101617.54	101558.06	102690.63	103741.13	104159.47	104032.30	291.23	290.98	291.51	293.45	293.59	294.00
17-Mar-08	58	4013.62	101711.27	101617.54	101558.06	102679.69	103741.13	104186.70	104015.84	291.24	291.06	291.45	293.51	293.69	294.04
17-Mar-08	59	4028.93	101711.27	101617.54	101558.06	102685.16	103779.43	104212.58	103966.65	291.40	291.44	291.53	293.85	294.03	294.28
17-Mar-08	60	4024.28	101711.27	101617.54	101558.06	102685.16	103746.60	104170.76	104015.84	291.42	291.47	291.56	293.86	294.01	294.23
17-Mar-08	4000 - 3	4021.57	101707.96	101617.54	101558.06	102684.07	103745.50	104174.61	104007.10	291.36	291.30	291.52	293.71	293.88	294.17
17-Mar-08	61	4023.85	101689.18	101645.11	101596.36	102778.18	103456.62	103756.42	103670.33	291.59	291.60	291.81	293.85	293.93	294.07
17-Mar-08	62	4027.41	101689.18	101645.11	101596.36	102783.65	103511.33	103830.79	103670.15	291.52	291.53	291.80	293.77	293.83	294.00
17-Mar-08	63	4024.60	101694.70	101645.11	101596.36	102778.18	103522.27	103846.73	103642.89	291.64	291.71	291.82	293.93	294.03	294.13
17-Mar-08	64	4029.69	101694.70	101628.58	101590.89	102789.12	103429.26	103687.36	103708.56	291.68	291.73	291.82	293.97	294.08	294.19
17-Mar-08	65	4025.79	101694.70	101645.11	101596.36	102789.12	103527.75	103846.73	103659.35	291.70	291.77	291.86	293.98	294.07	294.22
17-Mar-08	4000 - 3 1/3	4026.27	101692.49	101641.80	101595.27	102783.65	103489.45	103793.61	103670.26	291.63	291.67	291.82	293.90	293.99	294.12
17-Mar-08	66	4029.47	101689.18	101667.17	101651.08	102646.86	103040.80	103028.67	102989.87	291.69	291.68	291.97	294.12	294.25	294.58
17-Mar-08	67	4021.91	101694.70	101667.17	101651.08	102641.39	103019.03	103018.04	102973.41	291.74	291.75	291.96	294.20	294.33	294.65
17-Mar-08	68	4024.50	101694.70	101672.68	101651.08	102663.28	103046.27	103018.04	103017.31	291.75	291.76	292.01	294.20	294.34	294.61
17-Mar-08	69	4034.02	101694.70	101667.17	101651.08	102657.81	103019.03	103018.04	102984.38	291.71	291.65	291.97	294.12	294.22	294.52
17-Mar-08	70	4032.61	101694.70	101667.17	101651.08	102668.75	103035.33	103007.42	103006.33	291.74	291.75	291.99	294.19	294.34	294.62
17-Mar-08	4000 - 3 2/3	4028.50	101693.59	101668.27	101651.08	102655.62	103032.09	103018.04	102994.26	291.73	291.72	291.98	294.17	294.29	294.59
17-Mar-08	71	4529.16	101694.70	101358.44	101317.31	100455.01	104666.04	105615.65	105645.85	291.52	291.37	291.69	294.57	295.41	297.26
17-Mar-08	72	4523.01	101694.70	101352.93	101322.78	100433.18	104551.13	105620.96	105618.41	291.51	291.20	291.61	294.40	295.29	297.24
17-Mar-08	73	4519.20	101694.70	101347.42	101322.78	100460.50	104737.17	105599.72	105629.38	291.46	291.19	291.62	294.37	295.22	297.14
17-Mar-08	74	4529.70	101694.70	101352.93	101317.31	100455.01	104594.90	105631.59	105662.31	291.43	290.97	291.62	294.31	295.16	297.07
17-Mar-08	75	4521.78	101694.70	101352.93	101328.25	100465.98	104578.49	105626.28	105640.36	291.72	291.56	291.72	294.81	295.70	297.56
17-Mar-08	4500 - 0	4524.57	101694.70	101352.93	101321.68	100453.94	104625.55	105618.84	105639.26	291.53	291.26	291.65	294.49	295.36	297.26
17-Mar-08	76	4530.11	101694.70	101363.96	101333.72	100608.61	104676.98	105620.96	105607.43	291.78	291.63	291.89	294.88	295.68	297.43
17-Mar-08	77	4517.97	101694.70	101363.96	101344.66	100619.59	104666.04	105620.96	105640.36	291.86	291.78	291.93	294.98	295.79	297.56
17-Mar-08	78	4520.15	101694.70	101363.96	101339.19	100630.56	104643.89	105599.72	105590.97	292.01	292.05	292.07	295.22	296.02	297.65
17-Mar-08	79	4532.85	101694.70	101358.44	101333.72	100636.04	104616.79	105573.15	105580.00	292.08	292.08	292.10	295.25	296.05	297.78
17-Mar-08	80	4530.25	101694.70	101363.96	101333.72	100619.59	104600.38	105573.15	105640.36	292.05	291.90	292.12	295.04	295.88	297.62
17-Mar-08	4500 - 1	4526.27	101694.70	101362.85	101337.00	100622.88	104640.82	105597.59	105611.82	291.96	291.89	292.02	295.07	295.88	297.61
17-Mar-08	81	4522.60	101689.18	101430.11	101399.38	101491.84	104562.07	105466.91	105206.84	291.79	291.57	291.69	294.77	295.42	296.78
17-Mar-08	82	4517.70	101689.18	101435.62	101399.38	101491.84	104550.88	105472.23	105212.33	291.66	291.20	291.75	294.46	295.09	296.57
17-Mar-08	83	4525.47	101694.70	101435.62	101399.38	101497.32	104665.78	105493.47	105206.84	291.22	291.03	291.59	294.29	294.76	296.17
17-Mar-08	84	4520.56	101694.70	101430.11	101404.85	101497.32	104567.29	105520.03	105201.36	291.40	291.18	291.57	294.40	294.96	296.35
17-Mar-08	85	4519.06	101694.70	101435.62	101404.85	101497.32	104594.65	105466.91	105206.84	291.56	291.41	291.69	294.64	295.30	296.63
17-Mar-08	4500 - 2	4521.08	101692.49	101433.42	101401.57	101495.13	104588.14	105483.91	105206.84	291.53	291.28	291.66	294.51	295.11	296.50

Table B.03 6D 4L Raw Data, Page 3

Date	Run	RPM	P_cell	Ps_in	Pt_in	Ps_out	Pt_A	Pt_B	Pt_C	Tt_10	Tt_12	Tt_2	Tt_A	Tt_B	Tt_C
17-Mar-08	87	4520.56	101694.70	101501.76	101465.04	102116.15	104649.36	105360.67	104998.32	291.86	291.81	291.82	294.98	295.48	296.40
17-Mar-08	88	4531.07	101694.70	101496.25	101426.74	102099.73	104611.07	105350.05	104970.88	291.98	291.94	291.91	295.10	295.62	296.51
17-Mar-08	89	4531.48	101694.70	101496.25	101459.57	102110.68	104638.42	105376.61	104970.88	292.06	292.00	291.98	295.13	295.68	296.61
17-Mar-08	90	4534.22	101689.18	101485.24	101470.51	102116.15	104589.18	105360.67	104976.37	292.11	292.07	292.01	295.23	295.75	296.64
17-Mar-08	4500 - 2 1/2	4528.04	101693.59	101496.25	101455.19	102109.58	104628.57	105359.61	104974.17	291.95	291.88	291.89	295.04	295.56	296.48
17-Mar-08	91	4540.54	101694.70	101573.44	101503.34	102827.42	104381.27	105015.39	104636.14	292.22	292.35	292.53	295.32	295.54	295.87
17-Mar-08	92	4530.80	101694.70	101556.91	101503.34	102843.83	104381.27	105015.39	104658.09	292.23	292.34	292.52	295.31	295.55	295.87
17-Mar-08	93	4529.43	101689.18	101562.42	101503.34	102827.42	104375.80	105004.76	104603.21	292.24	292.36	292.53	295.31	295.57	295.92
17-Mar-08	94	4526.01	101694.70	101578.95	101503.34	102832.89	104457.87	105031.32	104619.67	292.28	292.41	292.56	295.35	295.61	295.90
17-Mar-08	95	4524.79	101689.18	101556.91	101497.87	102827.42	104414.10	105015.39	104608.70	292.23	292.34	292.51	295.30	295.56	295.86
17-Mar-08	4500 - 3	4530.31	101692.49	101565.72	101502.25	102831.79	104402.06	105016.45	104625.16	292.24	292.36	292.53	295.32	295.57	295.88
17-Mar-08	96	4536.97	101694.70	101612.03	101552.59	103073.63	104124.12	104579.80	104317.86	291.30	291.02	292.27	294.08	294.01	294.38
17-Mar-08	97	4546.73	101694.70	101617.54	101558.06	103062.68	104031.11	104457.62	104328.83	291.55	291.47	292.27	294.45	294.48	294.75
17-Mar-08	98	4544.53	101694.70	101595.50	101552.59	103062.68	104036.58	104420.43	104350.78	291.72	291.61	292.26	294.54	294.57	294.83
17-Mar-08	99	4530.39	101694.70	101617.54	101558.06	103062.68	104058.46	104516.05	104339.58	291.71	291.56	292.28	294.53	294.60	294.83
17-Mar-08	100	4528.75	101694.70	101617.54	101552.59	103068.15	104102.23	104526.67	104317.86	291.88	291.86	292.33	294.78	294.89	295.03
17-Mar-08	4500 - 3 1/3	4537.47	101694.70	101612.03	101554.78	103065.97	104070.50	104500.11	104330.98	291.63	291.50	292.28	294.48	294.51	294.77
17-Mar-08	101	4538.89	101694.70	101678.19	101634.67	102887.60	103396.43	103358.02	103313.64	291.99	291.80	292.39	294.84	295.03	295.43
17-Mar-08	102	4541.22	101694.70	101678.19	101634.67	102876.66	103418.32	103379.26	103346.56	291.99	291.77	292.40	294.78	294.96	295.35
17-Mar-08	103	4541.77	101694.70	101672.68	101634.67	102898.54	103423.79	103405.82	103374.00	291.97	291.65	292.35	294.71	294.90	295.29
17-Mar-08	104	4544.11	101694.70	101672.68	101634.67	102882.13	103423.79	103384.58	103346.56	291.68	291.11	292.28	294.27	294.43	294.86
17-Mar-08	4500 - 3 2/3	4541.50	101694.70	101675.43	101634.67	102886.23	103415.58	103381.92	103345.19	291.91	291.58	292.36	294.65	294.83	295.23
17-Mar-08	115	5039.18	101711.27	101281.23	101262.55	100153.29	105349.69	106682.02	106682.56	292.13	291.90	292.19	295.77	296.93	299.32
17-Mar-08	116	5030.56	101705.75	101286.74	101262.55	100153.29	105305.92	106634.22	106726.46	292.08	291.77	292.24	295.66	296.74	299.11
17-Mar-08	117	5021.47	101711.27	101292.25	101257.08	100158.77	105366.11	106634.22	106688.05	292.07	291.93	292.26	295.89	296.96	299.24
17-Mar-08	118	5028.87	101711.27	101275.71	101246.13	100153.29	105327.81	106618.29	106699.02	292.33	292.27	292.31	296.12	297.23	299.51
17-Mar-08	119	5023.65	101711.27	101281.23	101246.13	100147.80	105284.04	106682.02	106704.51	292.29	292.25	292.32	296.07	297.17	299.43
17-Mar-08	5000 - 0	5028.75	101710.16	101283.43	101254.89	100153.29	105326.71	106650.16	106700.12	292.18	292.02	292.26	295.90	297.01	299.32
17-Mar-08	110	5029.21	101711.27	101303.28	101273.49	100328.84	105344.22	106666.09	106699.02	291.88	291.79	291.92	295.71	296.76	298.96
17-Mar-08	111	5033.60	101705.75	101297.77	101268.02	100350.78	105196.50	106687.33	106649.64	291.97	291.82	291.94	295.71	296.77	299.00
17-Mar-08	112	5023.65	101711.27	101303.28	101262.55	100328.84	105382.52	106671.40	106688.05	291.86	291.58	291.91	295.52	296.61	298.88
17-Mar-08	113	5017.77	101711.27	101292.25	101278.97	100345.29	105431.76	106692.64	106644.15	291.89	291.58	291.89	295.50	296.59	298.86
17-Mar-08	114	5032.92	101711.27	101303.28	101273.49	100339.81	105366.11	106628.91	106649.64	291.81	291.65	291.93	295.53	296.54	298.77
17-Mar-08	5000 - 1	5027.43	101710.16	101299.97	101271.31	100338.71	105344.22	106669.27	106666.10	291.88	291.69	291.92	295.59	296.66	298.89
17-Mar-08	105	5026.68	101711.27	101380.47	101333.72	101404.06	105322.34	106480.22	106254.57	291.98	291.84	292.09	295.76	296.62	298.36
17-Mar-08	106	5038.67	101705.75	101374.95	101355.58	101404.06	105234.79	106559.88	106298.46	292.10	291.97	292.02	295.87	296.79	298.50
17-Mar-08	107	5038.17	101711.27	101380.47	101339.19	101415.03	105207.44	106543.94	106243.59	292.11	292.07	292.01	295.89	296.77	298.44
17-Mar-08	108	5051.91	101711.27	101385.98	101339.19	101387.60	105360.63	106528.01	106276.51	292.00	291.78	292.04	295.73	296.61	298.38
17-Mar-08	109	5038.67	101711.27	101374.95	101355.58	101393.09	105344.22	106543.94	106243.59	291.34	290.86	291.82	294.98	295.77	297.72
17-Mar-08	5000 - 2	5038.82	101710.16	101379.36	101344.65	101400.77	105293.88	106531.20	106263.35	291.91	291.71	291.99	295.64	296.51	298.28
12-Mar-08	1	1006.49	101739.51	101728.49	101717.67	101695.66	101876.35	101899.07	101887.73	289.03	288.87	288.91	289.37	289.29	289.46
12-Mar-08	2	1006.46	101739.51	101728.49	101723.14	101695.66	101892.76	101899.07	101887.73	289.01	288.86	288.90	289.40	289.32	289.53
12-Mar-08	3	1006.96	101739.51	101728.49	101723.14	101695.66	101887.29	101899.07	101887.73	288.99	288.99	288.94	289.48	289.33	289.45
12-Mar-08	4	1006.48	101739.51	101728.49	101723.14	101690.17	101881.82	101904.38	101887.73	288.98	289.03	288.90	289.48	289.33	289.46
12-Mar-08	5	1007.31	101739.51	101728.49	101723.14	101695.66	101887.29	101899.07	101887.73	288.95	288.98	288.91	289.41	289.24	289.40
12-Mar-08	1000 - 0	1006.74	101739.51	101728.49	101722.05	101694.56	101885.10	101900.14	101887.73	288.99	288.94	288.91	289.43	289.30	289.46
12-Mar-08	6	1494.49	101739.51	101711.95	101695.78	101635.31	102051.43	102122.17	102101.77	288.57	288.30	288.41	289.04	289.03	289.34
12-Mar-08	7	1495.58	101739.51	101711.95	101695.78	101624.34	102067.85	102111.54	102096.28	288.60	288.37	288.40	289.10	289.07	289.38
12-Mar-08	8	1496.43	101739.51	101711.95	101695.78	101629.83	102067.85	102111.54	102090.79	288.68	288.42	288.49	289.12	289.13	289.47
12-Mar-08	9	1495.88	101739.51	101711.95	101695.78	101629.83	102067.85	102116.85	102090.79	288.55	288.17	288.50	288.96	288.90	289.25
12-Mar-08	10	1493.80	101739.51	101711.95	101695.78	101629.83	102056.90	102116.85	102096.28	288.48	288.00	288.44	288.78	288.87	289.22
12-Mar-08	1500 - 0	1495.23	101739.51	101711.95	101695.78	101629.83	102062.38	102115.79	102095.18	288.58	288.25	288.45	289.00	289.00	289.33
12-Mar-08	11	2005.92	101745.03	101684.38	101652.00	101520.11	102325.01	102440.87	102425.58	288.96	289.03	288.46	289.91	290.07	290.34
12-Mar-08	12	2005.11	101745.03	101684.38	101657.48	101520.11	102330.48	102451.49	102431.06	289.03	289.25	288.53	290.03	290.21	290.46
12-Mar-08	13	2006.11	101739.51	101678.87	101652.00	101525.59	102308.59	102435.56	102414.60	289.11	289.20	288.51	290.05	290.22	290.46
12-Mar-08	14	2003.13	101739.51	101678.87	101652.00	101514.62	102330.48	102424.94	102414.60	289.08	289.14	288.51	289.97	290.18	290.44
12-Mar-08	15	1998.94	101745.03	101684.38	101652.00	101525.59	102335.95	102430.25	102425.58	289.03	288.93	288.49	289.84	290.05	290.39
12-Mar-08	2000 - 0	2003.84	101742.82	101682.18	101653.10	101521.20	102326.10	102436.62	102422.28	289.04	289.11	288.50	289.96	290.15	290.42
12-Mar-08	16	2008.66	101733.98	101678.87	101652.01	101531.08	102319.52	102430.10	102414.46	289.20	289.27	288.45	290.12	290.28	290.54
12-Mar-08	17	2006.83	101739.51	101678.87	101652.01	101536.57	102319.52	102424.79	102408.97	289.11	289.36	288.60	290.15	290.15	290.32
12-Mar-08	18	2010.00	101733.98	101678.87	101652.01	101536.57	102346.88	102424.79	102419.94	288.97	289.20	288.61	290.02	289.96	290.27
12-Mar-08	19	2004.55	101739.51	101678.87	101657.48	101547.54	102330.46	102440.73	102419.94	289.04	289.34	288.64	290.20	290.23	290.41
12-Mar-08	20	2006.48	101739.51	101684.39	101657.48	101547.54	102335.93	102446.04	102408.97	289.16	289.36	288.66	290.21	290.32	290.55
12-Mar-08	2000 - 1	2007.30	101737.30	101679.97	101654.19	101539.86	102330.46	102433.29	102414.46	289.10	289.30	288.59	290.14	290.19	290.42
12-Mar-08	21	2005.46	101733.98	101695.41	101668.42	101706.63	102324.99	102419.48	102359.58	288.66	288.47	288.41	289.40	289.44	289.79
12-Mar-08	22	2004.90	101745.03	101689.90	101673.89	101701.15	102335.93	102424.79	102343.12	288.68	288.54	288.41	289.42	289.46	289.81
12-Mar-08	23	2005.68	101739.51	101695.41	101673.89	101706.63	102319.52	102419.48	102343.12	288.68	288.45	288.38	289.37	289.41	289.79
12-Mar-08	24	2000.91	101739.51	101689.90	101673.89	101706.63	102324.99	102414.17	102359.58	288.66	288.41	288.38	289.32	289.33	289.75
12-Mar-08	25	2000.03	101739.51	101695.41	101673.89	101701.15	102335.93	102408.86	102343.12	288.61	288.38	288.34	289.32	289.38	289.78
12-Mar-08	2000 - 2	2003.40	101739.51	101693.21	101672.80	101704.44	102328.27	102417.36	102349.71	288.66	288.45	288.38	289.37	289.40	289.78
12-Mar-08	26	2019.09	101739.51	101706.44	101690.31	101843.52	102319.52	102403.55	102315.69	288.18	287.82	288.28	288.86	288.92	289.28
12-Mar-08	27	2019.15	101739.51	101706.44	101690.31	101848.99	102303.11	102398.24	102315.69	288.19	287.66	288.27	288.69	288.64	289.09
12-Mar-08	28	2019.80	101739.51	101711.95	101690.31	101848.99	102330.46	102398.24	102304.71	288.17	287.78	288.28	288.84	288.83	289.23
12-Mar-08	29	2022.66	101739.51	101711.95	101690.31	101843.52	102308.58	102403.55	102321.18	288.30	288.01	288.26	288.97	288.96	289.30
12-Mar-08	30	2022.82	101739.51	101711.95	101690.31	101843.52	102341.41	102398.24	102310.20	288.28	287.99	288.25	288.96	288.98	289.30
12-Mar-08	2000 - 2.5	2020.71	101739.51	101709.75	101690.31	101845.70	102320.61	102400.36	102313.49	288.23	287.85	288.27	288.86	288.87	289.24
12-Mar-08	31	2010.43	101739.51	101717.47	101712.20	101958.41	102253.86	102339.82	102233.38	288.42	288.15	288.37	289.11	289.13	289.29
12-Mar-08	32	2006.75	101739.51	101722.98	101712.20	101958.41	102242.92	102334.51	102233.38	288.38	288.06	288.39	289.07	289.07	289.26
12-Mar-08	33	2004.66	101739.51	101722.98	101712.20	101958.41	102248.39	102334.51	102227.90	288.41	288.24	288.42	289.17	289.17	289.30
12-Mar-08	34	2002.76	101739.51	101722.98	101706.73	101952.94	102248.39	102329.20	102227.90	288.44	288.15	288.40	289.10	289.06	289.27
12-Mar-08	35	1990.11	101739.51	101722.98	101712.20	101952.94	102237.45	102323.89	102222.41	288.36	287.88	288.39	288.89	288.90	289.18
12-Mar-08	2000 - 3	2002.94	101739.51	101721.88	101711.10	101956.23	102246.20	102332.39	102228.99	288.40	288.10	288.39	289.07	289.07	289.26

Table B.04 6D 4L Raw Data, Page 4

Date	Run	RPM	P_cell	Ps_in	Pt_in	Ps_out	Pt_A	Pt_B	Pt_C	Tt_10	Tt_12	Tt_2	Tt_A	Tt_B	Tt_C
12-Mar-08	36	2010.27	101728.46	101734.01	101712.20	101942.00	102100.67	102116.78	102090.72	288.37	288.14	288.64	289.07	289.03	289.21
12-Mar-08	37	2008.47	101745.03	101734.01	101712.20	101947.47	102095.20	102106.25	102085.23	288.35	288.08	288.64	289.06	289.00	289.19
12-Mar-08	38	2009.79	101745.03	101739.52	101712.20	101947.47	102106.14	102132.71	102096.21	288.36	288.05	288.65	289.05	288.99	289.18
12-Mar-08	39	2007.77	101739.51	101734.01	101712.20	101947.47	102095.20	102111.47	102096.21	288.37	288.06	288.66	289.06	289.02	289.21
12-Mar-08	40	2003.75	101728.46	101739.52	101712.20	101942.00	102084.25	102106.16	102085.23	288.39	288.11	288.67	289.10	289.03	289.23
12-Mar-08	2000-3 1/3	2008.01	101737.30	101736.21	101712.20	101945.28	102096.29	102114.67	102090.72	288.37	288.09	288.65	289.07	289.01	289.20
12-Mar-08	41	1999.69	101728.46	101728.49	101723.15	101947.49	102040.51	102037.20	102030.39	288.44	288.39	288.75	289.44	289.42	289.51
12-Mar-08	42	2000.73	101728.46	101728.49	101723.15	101958.43	102035.04	102031.89	102035.87	288.46	288.45	288.75	289.52	289.46	289.56
12-Mar-08	43	2000.06	101728.46	101728.49	101723.15	101958.43	102045.98	102042.51	102035.87	288.50	288.49	288.75	289.54	289.51	289.58
12-Mar-08	44	2000.09	101728.46	101722.98	101723.15	101963.90	102045.98	102042.51	102052.34	288.51	288.51	288.77	289.58	289.55	289.64
12-Mar-08	45	2001.74	101728.46	101722.98	101723.15	101963.90	102045.98	102042.51	102041.36	288.54	288.51	288.77	289.59	289.56	289.65
12-Mar-08	2000-3 2/3	2000.46	101728.46	101726.29	101723.15	101958.43	102042.70	102039.32	102039.17	288.49	288.47	288.76	289.53	289.50	289.59
12-Mar-08	46	2993.61	101722.94	101585.16	101537.11	101201.98	103069.21	103413.03	103402.27	289.15	288.87	289.04	290.55	290.99	291.85
12-Mar-08	47	2993.25	101722.94	101579.65	101531.64	101196.50	103041.85	103418.34	103369.35	289.06	288.58	288.96	290.21	290.65	291.64
12-Mar-08	48	2992.00	101728.46	101585.16	101531.64	101201.98	103058.26	103397.09	103380.32	289.11	288.35	288.90	290.03	290.65	291.67
12-Mar-08	49	3001.34	101722.94	101585.16	101531.64	101201.98	103074.68	103402.40	103413.25	288.90	288.50	288.80	290.30	290.58	291.58
12-Mar-08	50	3002.12	101722.94	101579.65	101531.64	101201.98	103069.21	103402.40	103385.81	288.92	288.38	288.86	290.12	290.51	291.44
12-Mar-08	51	2998.40	101728.46	101585.16	101520.69	101201.98	103019.96	103381.15	103380.32	288.92	288.59	288.78	290.37	290.79	291.48
12-Mar-08	3000 - 0	2996.78	101724.78	101583.32	101530.72	101201.07	103055.53	103402.40	103388.56	289.01	288.54	288.89	290.26	290.70	291.61
12-Mar-08	52	3013.27	101728.46	101590.67	101537.11	101284.26	103030.90	103407.72	103374.84	289.68	289.65	289.26	291.25	291.61	292.31
12-Mar-08	53	3011.58	101728.46	101590.67	101537.11	101273.29	103096.57	103397.09	103374.84	289.64	289.45	289.27	291.03	291.38	292.15
12-Mar-08	54	3011.64	101728.46	101590.67	101537.11	101278.78	103085.62	103397.09	103391.30	289.55	289.27	289.23	290.81	291.18	292.11
12-Mar-08	55	3014.73	101722.94	101590.67	101537.11	101273.29	103014.49	103423.65	103380.32	289.47	289.11	289.22	290.77	291.17	292.09
12-Mar-08	56	3010.43	101728.46	101590.67	101537.11	101284.26	103058.26	103402.40	103358.37	289.44	289.07	289.15	290.81	291.20	292.07
12-Mar-08	3000 - 1	3012.33	101727.36	101590.67	101537.11	101278.78	103057.17	103405.59	103375.93	289.56	289.31	289.23	290.93	291.31	292.15
12-Mar-08	57	3001.70	101728.46	101618.24	101569.94	101613.38	103014.49	103343.97	103232.16	289.67	289.53	289.44	291.11	291.29	291.94
12-Mar-08	58	3004.16	101728.46	101618.24	101569.94	101613.38	102992.60	103354.59	103243.14	289.43	289.08	289.41	290.61	290.68	291.55
12-Mar-08	59	3005.61	101728.46	101618.24	101575.41	101613.38	103014.49	103359.91	103237.65	289.37	289.17	289.31	290.69	290.87	291.61
12-Mar-08	60	3009.04	101728.46	101618.24	101569.94	101613.38	103009.02	103333.35	103232.16	289.28	289.13	289.32	290.75	290.92	291.59
12-Mar-08	61	3002.42	101728.46	101623.75	101575.41	101618.87	103041.85	103338.66	103210.21	289.12	288.71	289.28	290.28	290.41	291.20
12-Mar-08	3000 - 2	3004.58	101728.46	101619.34	101572.13	101614.48	103014.49	103346.09	103231.06	289.37	289.12	289.35	290.69	290.83	291.58
12-Mar-08	62	3004.16	101728.46	101645.80	101608.24	101920.13	103009.02	103264.29	103094.97	289.81	289.91	289.65	291.50	291.67	291.94
12-Mar-08	63	3001.46	101722.94	101645.80	101608.24	101925.60	103003.55	103248.35	103084.00	289.87	290.05	289.69	291.55	291.74	292.03
12-Mar-08	64	2999.90	101728.46	101645.80	101608.24	101920.13	103019.96	103253.66	103089.48	289.94	290.08	289.70	291.66	291.83	292.07
12-Mar-08	65	3002.12	101728.46	101645.80	101613.71	101925.60	103047.32	103258.98	103073.02	289.98	290.11	289.73	291.68	291.92	292.19
12-Mar-08	66	2996.84	101728.46	101651.31	101613.71	101920.13	103025.43	103258.98	103073.02	290.10	290.29	289.80	291.84	292.02	292.22
12-Mar-08	3000-2 1/2	3000.89	101727.36	101646.90	101610.43	101922.32	103021.05	103256.85	103082.90	289.94	290.09	289.71	291.65	291.84	292.09
12-Mar-08	67	3006.27	101728.46	101678.88	101657.49	102242.97	102861.28	103104.93	102908.39	289.72	289.64	289.79	291.20	291.28	291.42
12-Mar-08	68	3006.21	101728.46	101684.39	101657.49	102242.97	102883.17	103099.61	102891.93	289.80	289.78	289.81	291.37	291.45	291.59
12-Mar-08	69	3007.72	101722.94	101684.39	101657.49	102248.44	102877.69	103104.93	102897.42	289.87	289.89	289.83	291.38	291.48	291.58
12-Mar-08	70	3005.91	101728.46	101678.88	101657.49	102248.44	102888.64	103110.24	102897.42	289.90	289.80	289.85	291.40	291.49	291.62
12-Mar-08	71	3011.16	101728.46	101678.88	101657.49	102242.97	102872.22	103110.24	102897.42	289.90	289.81	289.82	291.39	291.48	291.61
12-Mar-08	3000-3	3007.45	101727.36	101681.08	101657.49	102245.15	102876.60	103105.99	102898.52	289.84	289.78	289.82	291.35	291.44	291.57
12-Mar-08	72	3007.17	101722.94	101706.44	101690.32	102210.14	102576.75	102679.96	102568.17	290.22	290.30	290.33	291.64	291.67	291.96
12-Mar-08	73	3002.84	101728.46	101711.96	101690.32	102210.14	102593.16	102674.65	102579.14	290.21	290.26	290.31	291.55	291.58	291.89
12-Mar-08	74	3002.18	101728.46	101706.44	101690.32	102215.61	102587.69	102669.34	102573.65	290.12	290.12	290.29	291.49	291.52	291.83
12-Mar-08	75	3004.16	101728.46	101700.93	101690.32	102215.61	102587.69	102685.27	102573.65	290.16	290.33	290.27	291.61	291.64	291.89
12-Mar-08	76	3001.22	101728.46	101706.44	101690.32	102226.55	102604.10	102695.90	102573.65	290.17	290.22	290.28	291.53	291.53	291.83
12-Mar-08	3000-3 1/3	3003.51	101727.36	101706.44	101690.32	102215.61	102589.88	102681.02	102573.65	290.18	290.25	290.30	291.57	291.59	291.88
12-Mar-08	77	3007.11	101728.46	101722.98	101712.20	102264.85	102472.78	102467.48	102452.93	289.93	289.95	290.09	291.57	291.62	291.80
12-Mar-08	78	3006.93	101728.46	101722.98	101706.73	102248.44	102456.37	102440.92	102441.95	289.92	289.98	290.08	291.61	291.63	291.80
12-Mar-08	79	3007.41	101733.99	101722.98	101712.20	102264.85	102450.89	102456.85	102458.41	289.95	290.00	290.11	291.61	291.63	291.82
12-Mar-08	80	3016.55	101733.99	101722.98	101712.20	102259.38	102461.84	102462.16	102463.90	289.97	290.05	290.14	291.65	291.69	291.84
12-Mar-08	81	3013.82	101728.46	101722.98	101712.20	102242.97	102461.84	102456.85	102441.95	289.97	290.04	290.16	291.64	291.65	291.83
12-Mar-08	3000-3 2/3	3010.36	101730.67	101722.98	101711.11	102256.10	102460.74	102456.85	102451.83	289.95	290.00	290.12	291.62	291.64	291.82
12-Mar-08	82	3513.07	101728.46	101524.52	101455.03	100999.02	103397.51	104023.92	104088.22	290.38	290.29	290.47	292.42	292.89	293.95
12-Mar-08	83	3521.07	101722.94	101530.03	101455.03	100999.02	103424.87	104061.10	104088.22	290.10	289.82	290.36	292.01	292.43	293.63
12-Mar-08	84	3512.65	101728.46	101530.03	101460.50	100993.54	103457.70	104050.48	104077.24	290.15	289.99	290.30	292.13	292.65	293.82
12-Mar-08	85	3513.56	101728.46	101530.03	101455.03	100999.02	103485.06	104055.79	104088.22	290.16	289.90	290.30	292.06	292.52	293.65
12-Mar-08	86	3508.96	101728.46	101530.03	101449.56	101004.51	103506.95	104013.29	104038.83	290.11	289.91	290.29	292.01	292.37	293.48
12-Mar-08	3500-0	3513.86	101727.36	101528.93	101455.03	100999.02	103454.42	104040.92	104076.15	290.18	289.98	290.34	292.13	292.57	293.70
12-Mar-08	87	3513.48	101728.46	101535.54	101465.98	101086.79	103452.23	104045.17	104082.73	290.01	289.86	290.38	291.95	292.39	293.48
12-Mar-08	88	3512.57	101722.94	101535.54	101460.50	101081.30	103506.95	104018.60	104033.34	290.07	290.11	290.39	292.27	292.65	293.51
12-Mar-08	89	3515.04	101728.46	101535.54	101465.98	101086.79	103490.53	104050.48	104066.27	290.28	290.10	290.39	292.23	292.64	293.66
12-Mar-08	90	3520.32	101728.46	101535.54	101465.98	101086.79	103534.31	104039.85	104044.32	290.26	290.33	290.42	292.43	292.91	293.89
12-Mar-08	91	3521.07	101733.99	101535.54	101471.45	101081.30	103539.78	104077.04	104088.22	290.33	290.19	290.40	292.23	292.73	293.84
12-Mar-08	92	3513.81	101728.46	101535.54	101465.98	101081.30	103496.01	104055.79	104066.27	290.02	289.55	290.25	291.74	292.07	293.42
12-Mar-08	3500-1	3516.05	101728.46	101535.54	101465.97	101084.05	103503.30	104047.82	104063.52	290.16	290.02	290.37	292.14	292.57	293.63
12-Mar-08	93	3521.23	101733.99	101574.13	101515.22	101580.47	103457.70	103997.36	103868.72	289.65	289.35	290.14	291.43	291.40	292.32
12-Mar-08	94	3522.39	101728.46	101574.13	101515.22	101591.44	103474.12	103986.73	103863.23	289.70	289.61	290.17	291.88	292.03	292.86
12-Mar-08	95	3523.13	101728.46	101579.65	101515.22	101574.99	103479.59	103970.80	103852.25	289.73	289.12	290.16	291.29	291.56	292.71
12-Mar-08	96	3528.85	101728.46	101579.65	101520.69	101574.99	103485.06	103997.36	103852.25	289.76	289.42	290.09	291.67	292.03	292.98
12-Mar-08	97	3526.11	101728.46	101574.13	101515.22	101580.47	103446.76	103992.04	103857.74	289.97	289.70	290.12	291.97	292.31	293.14
12-Mar-08	98	3535.76	101728.46	101574.13	101515.22	101580.47	103496.01	103986.73	103863.23	290.21	290.02	290.42	292.29	292.61	293.41
12-Mar-08	99	3538.59	101728.46	101568.62	101515.22	101564.02	103496.01	103997.36	103868.72	290.21	290.23	290.53	292.41	292.68	293.43
12-Mar-08	100	3539.26	101728.46	101574.13	101515.22	101569.50	103490.53	104013.29	103846.77	290.28	290.25	290.53	292.36	292.59	293.34
12-Mar-08	3500-2	3529.42	101729.15	101574.82	101515.90	101577.04	103478.22	103992.71	103859.11	289.94	289.71	290.27	291.91	292.15	293.03
12-Mar-08	101	3520.82	101728.46	101612.72	101564.47	102029.57	103474.12	103864.55	103588.85	291.21	291.51	291.14	293.47	293.72	294.04
12-Mar-08	102	3520.07	101733.99	101618.24	101569.94	102040.51	103506.95	103917.68	103594.34	291.25	291.50	291.14	293.48	293.78	294.10
12-Mar-08	103	3524.71	101728.46	101618.24	101569.94	102024.09	103506.95	103891.11	103616.29	291.27	291.56	291.15	293.57	293.84	294.14
12-Mar-08	104	3526.20	101728.46	101618.24	101575.41	102018.62	103485.06	103885.80	103577.88	291.40	291.70	291.23	293.67	293.96	294.24
12-Mar-08	105	3527.52	101728.46	101618.24	101575.41	102035.04	103485.06	103896.43	103610.80	291.44	291.74	291.25	293.69	293.98	294.28
12-Mar-08	3500-2 1/2	3523.86	101729.57	101617.13	101571.03	102029.57	103491.63	103891.11	103597.63	291.31	291.60	291.18	293.57	293.85	294.16

Table B.05 6D 4L Raw Data, Page 5

Date	Run	RPM	P_cell	Ps_in	Pt_in	Ps_out	Pt_A	Pt_B	Pt_C	Tt_10	Tt_12	Tt_2	Tt_A	Tt_B	Tt_C
12-Mar-08	106	3524.37	101728.46	101656.83	101619.18	102418.06	103381.10	103699.88	103407.76	290.41	289.74	290.62	291.97	292.14	292.56
12-Mar-08	107	3528.85	101728.46	101656.83	101619.18	102412.59	103348.27	103689.26	103418.74	290.40	290.03	290.61	292.15	292.26	292.64
12-Mar-08	108	3522.55	101728.46	101656.83	101619.18	102412.59	103353.74	103683.94	103407.76	290.52	290.41	290.66	292.43	292.57	292.79
12-Mar-08	109	3526.61	101728.46	101656.83	101619.18	102423.53	103353.74	103699.88	103407.76	290.61	290.53	290.66	292.53	292.67	292.86
12-Mar-08	110	3532.01	101733.99	101662.34	101619.18	102407.12	103348.27	103694.57	103407.76	290.66	290.74	290.69	292.70	292.80	292.93
12-Mar-08	3500-3	3526.88	101729.57	101657.93	101619.18	102414.78	103357.02	103693.51	103409.96	290.52	290.29	290.65	292.36	292.49	292.75
12-Mar-08	111	3517.35	101728.46	101695.42	101673.90	102423.53	102943.36	103088.99	102935.83	290.57	290.41	290.86	292.26	292.28	292.64
12-Mar-08	112	3516.53	101728.46	101695.42	101668.43	102418.06	102926.94	103051.81	102924.86	290.48	290.25	290.82	292.15	292.13	292.53
12-Mar-08	113	3522.64	101728.46	101689.90	101673.90	102423.53	102948.83	103078.37	102930.34	290.50	290.28	290.78	292.16	292.16	292.56
12-Mar-08	114	3521.89	101728.46	101695.42	101673.90	102418.06	102948.83	103094.30	102913.88	290.48	290.28	290.81	292.17	292.20	292.58
12-Mar-08	115	3519.99	101728.46	101689.90	101673.90	102407.12	102943.36	103073.05	102913.88	290.48	290.33	290.80	292.21	292.18	292.53
12-Mar-08	3500-3 1/3	3519.68	101728.46	101693.21	101672.81	102418.06	102942.26	103077.30	102923.76	290.50	290.31	290.81	292.19	292.19	292.57
12-Mar-08	116	3517.84	101728.46	101717.47	101712.20	102461.84	102713.54	102711.83	102705.35	290.79	290.78	291.14	292.94	292.99	293.24
12-Mar-08	117	3515.70	101728.46	101717.47	101706.73	102456.37	102713.54	102717.14	102705.35	290.87	290.86	291.15	292.98	293.03	293.25
12-Mar-08	118	3512.65	101728.46	101717.47	101706.73	102461.84	102708.07	102711.83	102716.33	290.85	290.75	291.15	292.95	292.97	293.21
12-Mar-08	119	3512.65	101728.46	101722.98	101712.20	102456.37	102708.07	102701.21	102705.35	290.80	290.75	291.14	292.94	292.95	293.17
12-Mar-08	120	3507.40	101728.46	101722.98	101701.26	102461.84	102729.96	102717.14	102710.84	290.77	290.62	291.14	292.82	292.86	293.12
12-Mar-08	3500-3 2/3	3513.25	101728.46	101719.67	101707.82	102459.65	102714.63	102711.83	102708.65	290.82	290.75	291.14	292.93	292.96	293.20
25-Feb-08	1	984.29	102110.90	102105.40	102100.01	102110.94	102203.97	102259.85	102226.20	290.26	289.56	290.11	290.08	290.07	290.44
25-Feb-08	2	995.37	102116.43	102110.91	102100.01	102110.94	102203.97	102259.85	102226.20	290.17	289.51	290.08	290.05	290.09	290.44
25-Feb-08	3	1004.03	102110.90	102105.40	102100.01	102110.94	102203.97	102259.85	102231.69	290.19	289.65	290.09	290.12	290.14	290.46
25-Feb-08	4	1014.39	102110.90	102105.40	102100.01	102110.94	102209.45	102265.16	102231.69	290.11	289.46	290.05	289.97	289.99	290.32
25-Feb-08	5	1025.97	102116.43	102110.91	102094.54	102110.94	102209.45	102270.47	102237.17	290.05	289.75	290.05	290.17	290.09	290.32
25-Feb-08	1000	1004.81	102113.11	102107.60	102098.91	102110.94	102206.16	102263.04	102230.59	290.16	289.59	290.08	290.08	290.08	290.40
25-Feb-08	6	1505.18	102116.43	102094.37	102083.59	102116.43	102335.29	102472.33	102418.29	290.31	290.25	289.96	290.77	290.85	290.95
25-Feb-08	7	1506.13	102116.43	102094.37	102083.59	102110.94	102329.82	102472.33	102418.29	290.32	290.30	289.99	290.88	290.98	291.02
25-Feb-08	8	1507.74	102116.43	102094.37	102083.59	102116.43	102329.82	102472.33	102412.81	290.44	290.40	290.02	290.93	291.09	291.14
25-Feb-08	9	1510.21	102116.43	102094.37	102078.12	102121.90	102318.88	102482.95	102423.78	290.45	290.52	290.01	291.08	291.24	291.22
25-Feb-08	10	1513.63	102110.90	102094.37	102083.59	102116.43	102335.29	102477.64	102423.78	290.50	290.61	290.06	291.08	291.16	291.16
25-Feb-08	1500	1508.58	102115.32	102094.37	102082.50	102116.42	102329.82	102475.52	102419.39	290.40	290.41	290.00	290.95	291.06	291.10
25-Feb-08	11	2004.26	102110.90	102066.80	102056.23	102121.90	102499.44	102775.10	102676.24	290.14	289.96	289.92	290.80	290.81	291.08
25-Feb-08	12	2007.13	102110.90	102072.32	102050.76	102127.37	102499.44	102759.16	102681.73	290.22	290.05	289.91	290.86	290.94	291.22
25-Feb-08	13	2007.50	102110.90	102072.32	102050.76	102121.90	102483.02	102769.79	102681.73	290.33	290.30	289.94	291.08	291.18	291.35
25-Feb-08	14	2007.69	102110.90	102066.80	102050.76	102121.90	102477.56	102764.47	102681.73	290.36	290.39	289.96	291.20	291.26	291.43
25-Feb-08	15	2007.07	102110.90	102072.32	102056.23	102127.37	102493.97	102769.79	102676.24	290.40	290.40	289.98	291.16	291.24	291.40
25-Feb-08	2000	2006.73	102110.90	102070.11	102052.95	102124.09	102490.68	102767.66	102679.53	290.29	290.22	289.94	291.02	291.09	291.29
25-Feb-08	16	2504.77	102105.38	102039.23	102023.39	102127.37	102690.94	103178.80	103043.96	289.31	288.94	289.49	290.29	290.39	290.86
25-Feb-08	17	2504.81	102110.90	102044.75	102028.87	102127.37	102701.88	103184.11	103043.96	289.56	289.26	289.55	290.54	290.64	291.02
25-Feb-08	18	2506.65	102105.38	102044.75	102017.92	102132.84	102680.00	103184.11	103054.94	289.94	289.88	289.59	291.07	291.33	291.53
25-Feb-08	19	2510.64	102116.43	102039.23	102023.39	102127.37	102674.53	103184.11	103065.92	290.19	290.11	289.71	291.34	291.59	291.78
25-Feb-08	20	2511.56	102110.90	102044.75	102023.39	102127.37	102680.00	103189.42	103071.40	290.27	290.31	289.76	291.54	291.74	291.87
25-Feb-08	2500	2507.69	102109.80	102042.54	102023.39	102128.47	102685.47	103184.11	103056.04	289.85	289.70	289.62	290.96	291.14	291.41
25-Feb-08	21	3018.97	102105.38	102011.67	101985.09	102138.32	102964.52	103683.43	103532.43	290.67	290.76	290.40	292.25	292.48	292.86
25-Feb-08	22	3018.31	102110.90	102011.67	101985.09	102138.32	102975.46	103715.30	103515.96	290.70	290.82	290.40	292.31	292.54	292.88
25-Feb-08	23	3021.59	102105.38	102011.67	101985.09	102138.32	102953.58	103725.92	103526.94	290.67	290.87	290.43	292.31	292.51	292.86
25-Feb-08	24	3020.19	102110.90	102017.18	101985.09	102143.79	102986.40	103699.36	103526.94	290.63	290.67	290.37	292.12	292.34	292.75
25-Feb-08	25	3018.97	102105.38	102017.18	101990.56	102138.32	102986.40	103725.92	103494.01	290.62	290.69	290.40	292.15	292.36	292.73
25-Feb-08	3000	3019.61	102107.59	102013.87	101986.18	102139.41	102973.27	103709.98	103519.26	290.66	290.76	290.40	292.23	292.45	292.82
25-Feb-08	26	3517.43	102110.90	101973.07	101946.78	102149.26	103292.81	104326.16	104092.24	290.67	290.75	290.48	292.73	293.08	293.59
25-Feb-08	27	3512.08	102105.38	101978.58	101946.78	102154.73	103265.45	104336.78	104103.22	290.79	290.80	290.56	292.63	293.02	293.55
25-Feb-08	28	3510.85	102110.90	101978.58	101946.78	102149.26	103276.40	104315.54	104086.75	290.77	290.83	290.55	292.77	293.13	293.71
25-Feb-08	29	3509.70	102110.90	101973.07	101941.31	102149.26	103259.98	104299.60	104097.73	290.86	291.02	290.63	292.97	293.31	293.79
25-Feb-08	30	3512.90	102110.90	101973.07	101946.78	102149.26	103303.76	104315.54	104081.27	291.01	291.34	290.74	293.19	293.53	293.99
25-Feb-08	3500	3512.59	102109.80	101975.28	101945.68	102150.36	103279.68	104318.72	104092.24	290.82	290.95	290.59	292.86	293.22	293.73
17-Apr-08	1	3030.56	101368.11	101219.27	101193.03	100814.20	102686.93	103020.47	103014.81	293.12	293.01	293.08	294.56	294.87	295.66
17-Apr-08	2	3027.75	101368.11	101224.78	101193.03	100814.20	102675.99	103020.47	103020.30	293.05	292.87	293.05	294.46	294.78	295.58
17-Apr-08	3	3027.38	101368.11	101224.78	101198.50	100814.20	102703.35	103036.40	103031.28	293.03	292.86	293.03	294.40	294.78	295.61
17-Apr-08	4	3025.80	101368.11	101230.29	101203.97	100808.72	102681.46	103036.40	103036.77	292.99	292.69	293.01	294.28	294.62	295.47
17-Apr-08	5	3025.67	101368.11	101230.29	101198.50	100808.72	102708.82	102993.90	103009.33	292.99	292.77	293.01	294.37	294.71	295.53
17-Apr-08	3000 - 0	3027.43	101368.11	101225.88	101197.40	100812.01	102691.31	103021.53	103022.50	293.04	292.84	293.04	294.42	294.75	295.57
17-Apr-08	6	3029.09	101362.59	101257.86	101231.34	101258.46	102686.93	102988.59	102828.19	292.87	292.74	293.07	294.34	294.58	295.15
17-Apr-08	7	3034.00	101368.11	101263.37	101236.81	101252.98	102665.05	102967.34	102839.17	292.93	292.76	293.10	294.38	294.60	295.18
17-Apr-08	8	3031.73	101362.59	101257.86	101236.81	101258.46	102665.05	102983.28	102839.17	293.00	292.89	293.09	294.50	294.73	295.27
17-Apr-08	9	3031.54	101362.59	101257.86	101231.34	101252.98	102697.88	102972.66	102850.15	293.03	292.93	293.07	294.53	294.77	295.28
17-Apr-08	10	3034.24	101368.11	101263.37	101236.81	101263.95	102665.05	102962.03	102844.66	293.10	293.04	293.11	294.63	294.86	295.36
17-Apr-08	3000 - 2	3032.12	101364.80	101260.07	101234.62	101257.36	102675.99	102974.78	102840.27	292.99	292.87	293.09	294.48	294.71	295.25
17-Apr-08	11	3019.64	101362.59	101285.43	101264.18	101554.29	102659.57	102882.35	102679.99	293.17	292.97	293.23	294.53	294.70	295.10
17-Apr-08	12	3016.12	101362.59	101290.94	101258.71	101543.34	102643.16	102887.66	102707.44	293.12	293.03	293.25	294.60	294.73	295.05
17-Apr-08	13	3019.04	101362.59	101285.43	101253.23	101554.29	102632.21	102882.35	102707.44	293.19	293.15	293.26	294.66	294.83	295.18
17-Apr-08	14	3016.49	101368.11	101290.94	101264.18	101554.29	102648.63	102866.41	102690.97	293.21	293.12	293.25	294.65	294.82	295.16
17-Apr-08	15	3013.88	101362.59	101290.94	101264.18	101554.29	102637.69	102877.03	102701.95	293.21	293.15	293.26	294.65	294.81	295.16
17-Apr-08	3000 - 2.5	3017.03	101363.69	101288.73	101260.90	101552.10	102644.25	102879.16	102697.56	293.18	293.08	293.25	294.62	294.78	295.13
17-Apr-08	16	3034.18	101362.59	101312.99	101291.54	101844.42	102572.02	102759.87	102526.28	293.47	293.53	293.46	294.97	295.11	295.15
17-Apr-08	17	3032.89	101357.06	101312.99	101297.02	101855.36	102522.75	102770.49	102537.26	293.49	293.53	293.48	294.98	295.11	295.17
17-Apr-08	18	3032.95	101362.59	101312.99	101291.54	101849.89	102561.05	102770.49	102526.28	293.52	293.55	293.48	295.00	295.13	295.17
17-Apr-08	19	3031.30	101362.59	101312.99	101297.02	101844.42	102517.30	102759.87	102542.74	293.52	293.55	293.47	294.98	295.11	295.14
17-Apr-08	20	3031.85	101362.59	101312.99	101297.02	101844.42	102500.86	102743.94	102542.74	293.51	293.52	293.47	294.97	295.09	295.16
17-Apr-08	3000 - 3	3032.63	101361.48	101312.99	101294.83	101847.70	102534.79	102760.93	102535.06	293.50	293.54	293.47	294.98	295.11	295.16
17-Apr-08	21	3024.21	101362.59	101335.05	101324.38	101838.84	102232.73	102324.35	102218.91	293.52	293.55	293.56	294.85	294.92	295.10
17-Apr-08	22	3024.03	101362.59	101340.56	101324.38	101833.37	102210.85	102313.73	102207.93	293.55	293.59	293.56	294.87	294.95	295.13
17-Apr-08	23	3029.16	101362.59	101335.05	101318.91	101844.32	102216.32	102308.42	102213.42	293.54	293.56	293.57	294.86	294.94	295.13
17-Apr-08	24	3027.75	101362.59	101335.05	101324.38	101838.84	102227.26	102319.04	102213.42	293.56	293.61	293.56	294.91	295.00	295.15
17-Apr-08	25	3027.38	101362.59	101335.05	101324.38	101833.37	102238.21	102340.28	102207.93	293.56	293.61	293.60	294.90	294.99	295.14
17-Apr-08	3000 - 3 1/3	3026.50	101362.59	101336.15	101323.29	101837.75	102225.07	102321.16	102212.32	293.55	293.58	293.57	294.88	294.96	295.13

Table B.06 6D 4L Raw Data, Page 6

Date	Run	RPM	P_cell	Ps_in	Pt_in	Ps_out	Pt_A	Pt_B	Pt_C	Tt_10	Tt_12	Tt_2	Tt_A	Tt_B	Tt_C
17-Apr-08	36	3028.67	101362.59	101312.99	101297.02	101849.79	102517.27	102743.94	102531.77	293.33	293.19	293.50	294.75	294.80	294.91
17-Apr-08	37	3029.34	101362.59	101312.99	101297.02	101855.26	102517.27	102733.32	102553.72	293.32	293.23	293.50	294.78	294.85	294.94
17-Apr-08	38	3028.67	101362.59	101312.99	101297.02	101855.26	102522.75	102754.56	102537.26	293.38	293.27	293.51	294.79	294.88	294.97
17-Apr-08	39	3028.18	101362.59	101312.99	101297.02	101855.26	102533.69	102754.56	102548.23	293.41	293.31	293.50	294.84	294.93	295.00
17-Apr-08	40	3028.54	101362.59	101312.99	101297.02	101855.26	102528.22	102743.94	102542.74	293.42	293.37	293.51	294.87	294.96	295.07
17-Apr-08	3000 - 3	3028.68	101362.59	101312.99	101297.02	101854.17	102523.84	102746.06	102542.74	293.37	293.27	293.50	294.81	294.88	294.98
17-Apr-08	41	3027.69	101362.59	101285.43	101258.71	101537.83	102637.66	102908.59	102712.90	293.37	293.21	293.54	294.77	294.88	295.29
17-Apr-08	42	3028.24	101362.59	101285.43	101258.71	101537.83	102659.54	102897.96	102707.41	293.36	293.14	293.51	294.73	294.88	295.30
17-Apr-08	43	3027.32	101362.59	101279.92	101258.71	101537.83	102643.13	102892.65	102718.38	293.39	293.23	293.54	294.82	294.96	295.36
17-Apr-08	44	3031.36	101362.59	101285.43	101258.71	101537.83	102692.38	102892.65	102701.92	293.39	293.11	293.56	294.72	294.86	295.32
17-Apr-08	45	3028.97	101362.59	101285.43	101264.18	101532.36	102692.38	102887.34	102707.41	293.37	293.17	293.55	294.78	294.92	295.37
17-Apr-08	3000 - 2 1/2	3028.72	101362.59	101284.33	101259.80	101536.73	102665.02	102895.84	102709.60	293.38	293.17	293.54	294.76	294.90	295.33
17-Apr-08	46	3023.54	101362.59	101257.86	101231.34	101241.99	102697.85	102924.52	102839.14	293.53	293.41	293.48	295.01	295.28	295.81
17-Apr-08	47	3025.61	101362.59	101263.38	101231.34	101258.44	102637.66	102982.94	102822.67	293.51	293.30	293.48	294.93	295.19	295.75
17-Apr-08	48	3022.81	101362.59	101257.86	101236.81	101258.44	102714.26	102940.45	102822.67	293.46	293.26	293.49	294.88	295.12	295.71
17-Apr-08	49	3025.43	101368.11	101263.38	101231.34	101258.44	102648.60	102956.39	102833.65	293.45	293.25	293.48	294.83	295.03	295.67
17-Apr-08	50	3017.03	101362.59	101263.38	101236.81	101252.96	102670.49	102967.01	102839.14	293.46	293.08	293.48	294.70	294.97	295.65
17-Apr-08	3000 - 2	3022.88	101363.69	101261.17	101233.53	101254.05	102673.77	102954.26	102831.45	293.48	293.26	293.48	294.87	295.12	295.72
17-Apr-08	51	3021.83	101362.59	101224.79	101198.50	100808.63	102621.24	103025.43	103020.27	293.20	292.75	293.37	294.53	294.90	295.76
17-Apr-08	52	3020.74	101362.59	101224.79	101198.50	100814.11	102697.85	102998.88	103020.27	293.26	292.89	293.39	294.55	294.90	295.79
17-Apr-08	53	3025.19	101362.59	101224.79	101198.50	100825.08	102681.43	103025.43	102998.31	293.24	292.88	293.38	294.57	294.90	295.73
17-Apr-08	54	3022.50	101368.11	101224.79	101187.56	100819.60	102643.13	102993.57	103014.78	293.23	292.99	293.35	294.67	295.02	295.77
17-Apr-08	55	3028.18	101362.59	101224.79	101198.50	100825.08	102615.77	103025.43	103009.29	293.31	293.13	293.36	294.83	295.17	295.90
17-Apr-08	3000 - 0	3023.69	101363.69	101224.79	101196.31	100818.50	102651.88	103013.75	103012.58	293.25	292.93	293.37	294.63	294.98	295.79
17-Apr-08	56	4032.18	101357.06	101103.50	101050.74	100353.32	103649.97	104390.35	104430.88	293.46	293.23	293.55	295.84	296.53	298.00
17-Apr-08	57	4028.93	101357.06	101103.50	101061.69	100358.81	103688.27	104416.98	104441.85	293.44	293.30	293.55	295.92	296.58	298.10
17-Apr-08	58	4035.43	101362.59	101120.04	101061.69	100353.32	103781.29	104416.91	104452.83	293.44	293.34	293.51	295.97	296.62	297.96
17-Apr-08	59	4034.67	101357.06	101109.01	101056.22	100358.81	103660.91	104363.87	104419.90	293.44	293.46	293.55	296.00	296.69	298.03
17-Apr-08	60	4038.04	101357.06	101114.52	101050.74	100358.81	103721.10	104374.49	104408.92	293.50	293.53	293.56	296.09	296.77	298.12
17-Apr-08	4000 - 0	4033.85	101358.17	101110.11	101056.22	100356.62	103700.31	104392.52	104430.88	293.46	293.37	293.54	295.97	296.63	298.04
17-Apr-08	61	4032.61	101357.06	101158.59	101110.94	101055.48	103573.31	104278.82	104134.42	293.56	293.43	293.77	295.99	296.40	297.42
17-Apr-08	62	4035.65	101362.59	101153.08	101127.36	101082.90	103660.86	104284.13	104139.91	293.50	293.46	293.73	296.05	296.50	297.61
17-Apr-08	63	4044.24	101357.06	101164.11	101116.42	101099.36	103649.91	104321.31	104128.93	293.56	293.62	293.71	296.18	296.63	297.68
17-Apr-08	64	4042.72	101357.06	101153.08	101127.36	101077.42	103737.46	104337.24	104145.40	293.75	293.71	293.72	296.25	296.77	297.81
17-Apr-08	65	4044.46	101362.59	101158.59	101121.89	101088.39	103649.91	104326.62	104139.91	293.70	293.62	293.69	296.18	296.68	297.75
17-Apr-08	4000 - 2	4039.94	101359.27	101157.49	101120.80	101080.71	103654.29	104309.62	104137.71	293.61	293.57	293.72	296.13	296.60	297.66
17-Apr-08	66	4040.21	101362.59	101208.22	101171.15	101707.48	103628.03	104209.78	103859.99	293.71	293.66	293.73	296.21	296.60	297.21
17-Apr-08	67	4046.97	101357.06	101208.22	101182.09	101718.43	103660.86	104220.40	103827.06	293.72	293.72	293.71	296.22	296.58	297.19
17-Apr-08	68	4032.94	101357.06	101208.22	101176.62	101702.01	103551.42	104236.33	103859.99	293.71	293.73	293.73	296.26	296.63	297.22
17-Apr-08	69	4037.17	101357.06	101208.22	101176.62	101702.01	103666.33	104193.84	103843.52	293.73	293.68	293.76	296.18	296.57	297.24
17-Apr-08	70	4035.54	101362.59	101208.22	101176.62	101718.43	103606.14	104204.46	103859.99	293.73	293.67	293.75	296.19	296.62	297.26
17-Apr-08	4000 - 2 1/2	4038.57	101359.27	101208.22	101176.62	101709.67	103622.55	104212.96	103850.11	293.72	293.69	293.74	296.21	296.60	297.22
17-Apr-08	71	4040.32	101362.59	101268.87	101236.82	102238.35	103414.63	103875.18	103728.26	293.87	293.97	293.90	296.32	296.51	296.79
17-Apr-08	72	4036.19	101357.06	101263.36	101236.82	102249.30	103474.82	103912.35	103717.28	293.83	293.92	293.91	296.28	296.48	296.77
17-Apr-08	73	4030.99	101362.59	101263.36	101236.82	102232.88	103502.17	103938.91	103711.80	293.83	293.90	293.92	296.27	296.47	296.80
17-Apr-08	74	4030.44	101357.06	101263.36	101247.76	102243.82	103403.68	103928.29	103728.26	293.83	293.89	293.92	296.28	296.49	296.79
17-Apr-08	75	4025.68	101357.06	101268.87	101231.35	102238.35	103469.34	103891.11	103722.77	293.83	293.90	293.94	296.27	296.47	296.77
17-Apr-08	4000 - 3	4032.73	101359.27	101265.56	101237.91	102240.54	103452.93	103909.17	103721.68	293.84	293.92	293.92	296.28	296.49	296.78
17-Apr-08	76	4037.82	101362.59	101285.41	101264.18	102391.59	103206.70	103588.38	103431.88	293.97	294.09	294.14	296.34	296.45	296.48
17-Apr-08	77	4040.00	101362.59	101290.93	101269.66	102397.06	103173.87	103529.95	103431.88	293.95	294.10	294.14	296.35	296.43	296.50
17-Apr-08	78	4042.39	101357.06	101290.93	101264.18	102397.06	103195.75	103545.89	103426.39	293.94	294.07	294.15	296.32	296.42	296.47
17-Apr-08	79	4040.87	101362.59	101290.93	101269.66	102391.59	103305.19	103710.53	103387.97	293.93	294.04	294.14	296.31	296.39	296.45
17-Apr-08	80	4038.15	101357.06	101285.41	101264.18	102397.06	103299.72	103641.49	103382.48	293.90	293.97	294.12	296.22	296.28	296.39
17-Apr-08	4000 - 3 1/3	4039.84	101360.38	101288.72	101266.37	102394.87	103236.24	103603.25	103412.12	293.94	294.05	294.14	296.31	296.39	296.46
17-Apr-08	81	4039.23	101357.06	101340.55	101324.38	102309.50	102692.35	102680.17	102674.44	293.56	293.36	293.88	295.97	296.10	296.37
17-Apr-08	82	4045.77	101362.59	101340.55	101324.38	102271.19	102670.46	102637.68	102619.56	293.53	293.36	293.87	295.93	296.03	296.32
17-Apr-08	83	4054.63	101357.06	101340.55	101324.38	102304.03	102659.52	102680.17	102663.47	293.50	293.27	293.87	295.88	296.00	296.31
17-Apr-08	84	4048.39	101362.59	101340.55	101329.86	102304.03	102708.76	102680.17	102657.98	293.47	293.23	293.85	295.87	295.98	296.29
17-Apr-08	85	4044.03	101362.59	101340.55	101324.38	102304.03	102670.46	102680.17	102657.98	293.46	293.20	293.86	295.85	295.95	296.25
17-Apr-08	4000 - 3 2/3	4046.41	101360.38	101340.55	101325.48	102298.55	102680.31	102671.68	102654.69	293.51	293.28	293.87	295.90	296.01	296.31
17-Apr-08	86	4046.21	101357.06	101301.96	101280.60	102418.96	103113.68	103439.66	103349.55	293.89	293.99	294.15	296.26	296.30	296.40
17-Apr-08	87	4041.74	101362.59	101301.96	101275.13	102418.96	103102.73	103365.31	103349.55	293.90	293.98	294.15	296.28	296.32	296.41
17-Apr-08	88	4036.08	101362.59	101296.44	101280.60	102418.96	103141.03	103460.91	103322.10	293.89	293.96	294.16	296.22	296.28	296.38
17-Apr-08	89	4032.39	101362.59	101296.44	101280.60	102418.96	103184.81	103529.95	103322.10	293.87	293.90	294.14	296.20	296.24	296.37
17-Apr-08	90	4035.65	101357.06	101296.44	101275.13	102413.48	103195.75	103492.77	103305.64	293.78	293.84	294.13	296.14	296.15	296.27
17-Apr-08	4000 - 3 1/3	4038.41	101360.38	101298.65	101278.41	102417.86	103147.60	103457.72	103329.79	293.87	293.93	294.15	296.22	296.26	296.36
17-Apr-08	91	4027.63	101362.59	101263.36	101242.29	102271.19	103496.70	103917.66	103706.31	293.91	294.00	294.04	296.42	296.62	296.87
17-Apr-08	92	4024.82	101357.06	101268.87	101247.76	102265.72	103491.23	103901.73	103711.80	293.94	294.03	294.06	296.46	296.65	296.91
17-Apr-08	93	4035.87	101362.59	101263.36	101236.82	102271.19	103452.93	103880.49	103706.31	293.96	293.98	294.08	296.40	296.61	296.90
17-Apr-08	94	4035.00	101357.06	101263.36	101236.82	102265.72	103458.40	103859.24	103700.82	293.96	294.03	294.09	296.44	296.64	296.92
17-Apr-08	95	4024.60	101357.06	101268.87	101236.82	102265.72	103431.04	103885.80	103722.77	293.96	294.02	294.12	296.44	296.62	296.90
17-Apr-08	4000 - 3	4029.58	101359.27	101265.56	101240.10	102267.90	103466.06	103888.98	103709.60	293.95	294.01	294.08	296.43	296.63	296.90
17-Apr-08	96	4044.03	101357.06	101213.73	101171.15	101680.12	103693.69	104215.09	103854.50	293.94	293.86	294.08	296.46	296.84	297.51
17-Apr-08	97	4045.77	101357.06	101202.70	101171.15	101674.65	103622.55	104183.22	103876.45	294.00	293.98	294.09	296.53	296.92	297.55
17-Apr-08	98	4044.79	101362.59	101208.22	101171.15	101674.65	103704.63	104209.78	103887.43	294.05	294.06	294.13	296.63	297.04	297.61
17-Apr-08	99	4052.88	101357.06	101208.22	101171.15	101696.54	103666.33	104225.71	103870.97	294.06	294.07	294.14	296.62	297.00	297.62
17-Apr-08	100	4050.91	101362.59	101202.70	101171.15	101674.65	103633.50	104225.71	103870.97	294.08	294.06	294.16	296.63	296.97	297.61
17-Apr-08	4000 - 2 1/2	4047.67	101359.27	101207.12	101171.15	101680.12	103664.14	104211.90	103872.06	294.03	294.00	294.12	296.58	296.96	297.58
17-Apr-08	101	4039.56	101362.59	101169.62	101121.89	101154.22	103704.63	104257.58	104096.00	294.05	294.00	294.19	296.56	297.02	298.04
17-Apr-08	102	4041.96	101362.59	101169.62	101127.36	101137.77	103704.63	104284.13	104106.98	294.08	294.03	294.18	296.59	297.08	298.12
17-Apr-08	103	4040.54	101362.59	101164.11	101127.36	101143.25	103584.25	104310.69	104134.42	294.08	294.06	294.19	296.60	297.06	298.11
17-Apr-08	104	4034.89	101362.59	101169.62	101121.89	101143.25	103551.42	104284.13	104106.98	294.12	294.00	294.18	296.64	297.15	298.16
17-Apr-08	105	4040.43	101362.59	101180.65	101121.89	101132.28	103666.33	104305.38	104090.51	294.11	294.03	294.18	296.60	297.09	298.13
17-Apr-08	4000 - 2	4039.48	101362.59	101170.72	101124.08	101142.15	103642.25	104288.38	104106.98	294.09	294.02	294.18	296.60	297.08	298.11

Table B.07 6D 4L Raw Data, Page 7

Date	Run	RPM	P_cell	Ps_in	Pt_in	Ps_out	Pt_A	Pt_B	Pt_C	Tt_10	Tt_12	Tt_2	Tt_A	Tt_B	Tt_C
17-Apr-08	106	4040.54	101368.11	101114.48	101067.16	100353.35	103710.10	104432.84	104430.81	293.92	293.76	294.00	296.46	297.08	298.50
17-Apr-08	107	4037.71	101362.59	101108.97	101067.16	100358.84	103710.10	104406.29	104419.83	293.92	293.82	294.01	296.45	297.12	298.55
17-Apr-08	108	4041.85	101362.59	101103.45	101050.74	100358.84	103628.03	104363.80	104430.81	293.84	293.74	294.01	296.36	296.94	298.34
17-Apr-08	109	4041.41	101362.59	101103.45	101072.63	100353.35	103704.63	104422.22	104469.23	293.86	293.70	294.01	296.36	296.99	298.48
17-Apr-08	110	4041.19	101362.59	101108.97	101056.22	100347.87	103622.55	104358.49	104430.81	293.89	293.74	294.02	296.43	297.07	298.50
17-Apr-08	4000 - 0	4040.54	101363.69	101107.86	101062.78	100354.45	103675.08	104396.73	104436.29	293.89	293.75	294.01	296.41	297.04	298.47
17-Apr-08	111	5056.85	101362.59	100960.09	100892.03	99749.96	104946.73	106291.73	106329.87	294.46	294.54	294.67	298.39	299.50	301.72
17-Apr-08	112	5066.76	101362.59	100965.60	100881.09	99744.47	104870.13	106249.25	106335.36	294.47	294.55	294.67	298.44	299.50	301.75
17-Apr-08	113	5067.10	101362.59	100954.58	100875.61	99755.44	104837.30	106265.18	106346.34	294.43	294.49	294.65	298.35	299.35	301.62
17-Apr-08	114	5069.50	101362.59	100954.58	100892.03	99744.47	105089.00	106307.67	106379.27	294.33	294.36	294.61	298.26	299.33	301.63
17-Apr-08	115	5067.27	101362.59	100954.58	100897.50	99760.93	104974.09	106323.60	106362.80	294.35	294.42	294.61	298.33	299.42	301.66
17-Apr-08	5000 - 0	5065.49	101362.59	100957.88	100887.65	99751.05	104943.45	106287.49	106350.73	294.41	294.47	294.64	298.35	299.42	301.68
17-Apr-08	116	5041.55	101362.59	101053.83	100996.02	100978.69	104842.77	106116.47	105857.85	294.49	294.43	294.60	298.32	299.13	300.93
17-Apr-08	117	5047.32	101362.59	101048.31	100996.02	100962.23	104985.04	106127.09	105879.80	294.49	294.46	294.57	298.34	299.17	300.90
17-Apr-08	118	5049.19	101362.59	101048.31	100990.54	100940.29	104908.43	106111.16	105868.83	294.50	294.37	294.61	298.29	299.14	300.98
17-Apr-08	119	5050.38	101362.59	101037.29	101001.49	100962.23	104859.18	106121.78	105841.38	294.50	294.35	294.63	298.27	299.14	300.90
17-Apr-08	120	5053.27	101362.59	101053.83	100985.07	100973.20	104837.30	106111.16	105852.36	294.46	294.41	294.61	298.27	299.12	300.89
17-Apr-08	5000 - 2	5048.34	101362.59	101048.31	100993.83	100963.33	104886.54	106117.53	105860.05	294.49	294.40	294.61	298.30	299.14	300.92
17-Apr-08	121	5067.61	101362.59	101108.97	101061.70	101838.83	104968.62	105994.31	105506.58	294.28	294.26	294.52	298.16	298.79	299.97
17-Apr-08	122	5059.41	101362.59	101120.00	101078.11	101844.30	104968.62	105941.20	105451.69	294.31	294.10	294.56	298.02	298.69	299.94
17-Apr-08	123	5056.68	101362.59	101120.00	101061.70	101849.78	105050.70	105941.20	105451.69	294.32	294.13	294.53	298.01	298.68	299.92
17-Apr-08	124	5059.92	101362.59	101120.00	101067.17	101838.83	104985.04	105946.51	105479.13	294.34	294.15	294.55	298.04	298.75	300.01
17-Apr-08	125	5057.70	101362.59	101108.97	101061.70	101833.36	104979.56	105951.82	105484.62	294.39	294.17	294.58	298.07	298.79	300.06
17-Apr-08	5000 - 2 1/2	5060.26	101362.59	101115.58	101066.07	101841.02	104990.51	105955.01	105474.74	294.33	294.16	294.55	298.06	298.74	299.98
17-Apr-08	126	5053.61	101362.59	101213.73	101160.21	102780.16	104705.97	105473.82	104952.14	294.59	294.65	294.75	298.31	298.65	299.03
17-Apr-08	127	5067.10	101362.59	101208.22	101171.15	102796.58	104744.28	105501.05	104946.66	294.55	294.60	294.74	298.22	298.56	298.98
17-Apr-08	128	5069.32	101357.07	101208.22	101165.68	102785.64	104711.45	105495.07	104952.23	294.53	294.55	294.74	298.21	298.53	298.94
17-Apr-08	129	5056.34	101357.07	101197.19	101165.68	102774.69	104722.39	105511.67	104979.67	294.51	294.56	294.73	298.19	298.54	298.92
17-Apr-08	130	5050.72	101357.07	101208.22	101171.15	102780.16	104760.69	105537.56	104941.17	294.48	294.54	294.75	298.19	298.50	298.91
17-Apr-08	5000 - 3	5059.42	101359.27	101207.12	101166.77	102783.45	104728.96	105503.83	104954.37	294.53	294.58	294.74	298.22	298.56	298.96
17-Apr-08	131	5044.26	101357.07	101257.84	101214.93	103048.33	104186.15	104730.81	104639.30	294.78	294.83	295.05	298.26	298.41	298.66
17-Apr-08	132	5047.66	101357.07	101257.84	101214.93	103048.33	104208.04	104693.63	104595.39	294.76	294.83	295.01	298.23	298.44	298.67
17-Apr-08	133	5065.56	101357.07	101257.85	101214.93	103048.33	104224.45	104736.12	104622.83	294.77	294.82	295.04	298.23	298.39	298.62
17-Apr-08	134	5052.42	101357.07	101252.33	101220.40	103059.28	104164.26	104582.08	104650.28	294.71	294.71	295.02	298.12	298.27	298.56
17-Apr-08	135	5047.32	101357.07	101252.33	101220.40	103048.33	104218.98	104698.40	104633.81	294.52	294.45	294.92	297.91	297.99	298.27
17-Apr-08	5000 - 3 1/3	5051.44	101357.07	101255.64	101217.12	103050.52	104200.38	104688.21	104628.32	294.71	294.73	295.01	298.15	298.30	298.56
17-Apr-08	136	5073.61	101357.07	101318.50	101307.97	102856.78	103403.68	103355.01	103365.97	294.78	294.74	294.99	298.47	298.69	299.08
17-Apr-08	137	5063.51	101357.07	101324.01	101307.97	102823.95	103370.85	103328.45	103283.64	294.79	294.75	294.97	298.46	298.71	299.07
17-Apr-08	138	5077.05	101357.07	101324.01	101307.97	102807.53	103365.38	103349.70	103327.55	294.78	294.76	294.99	298.46	298.68	299.09
17-Apr-08	139	5052.93	101357.07	101318.50	101307.97	102813.00	103370.85	103349.70	103311.08	294.63	294.56	294.95	298.28	298.52	298.91
17-Apr-08	5000 - 3 2/3	5066.77	101357.07	101321.26	101307.97	102825.32	103377.69	103345.71	103322.06	294.74	294.70	294.98	298.42	298.65	299.04
17-Apr-08	140	5043.25	101357.07	101279.90	101258.71	102813.00	103896.09	104199.61	103881.89	294.74	294.80	294.98	297.97	298.17	298.64
17-Apr-08	141	5045.28	101357.07	101279.90	101253.24	102813.00	103907.03	104220.86	103898.35	294.78	294.84	294.98	298.01	298.17	298.61
17-Apr-08	142	5048.85	101357.07	101268.88	101253.24	102834.89	103967.22	104284.61	103920.31	294.78	294.82	294.98	297.98	298.16	298.62
17-Apr-08	143	5052.42	101357.07	101279.90	101247.77	102823.95	103912.50	104220.86	103892.86	294.81	294.84	295.01	298.00	298.20	298.66
17-Apr-08	144	5044.94	101357.07	101268.88	101253.24	102856.78	103972.69	104305.85	103947.75	294.78	294.84	294.99	297.99	298.18	298.66
17-Apr-08	5000 - 3 1/3	5046.95	101357.07	101275.49	101253.24	102828.33	103931.11	104246.36	103908.23	294.78	294.83	294.99	297.99	298.17	298.64
17-Apr-08	145	5062.48	101357.07	101202.71	101160.21	102769.22	104744.20	105548.86	104996.05	294.73	294.78	295.08	298.45	298.78	299.23
17-Apr-08	146	5073.78	101357.07	101202.71	101160.21	102758.51	104744.20	105479.80	104957.63	294.84	294.89	295.18	298.56	298.90	299.32
17-Apr-08	147	5075.50	101357.07	101202.71	101165.68	102780.16	104755.14	105532.92	104985.08	294.86	294.91	295.19	298.57	298.92	299.31
17-Apr-08	148	5065.90	101357.07	101202.71	101165.68	102753.03	104689.48	105447.93	104963.12	294.87	294.93	295.20	298.59	298.89	299.27
17-Apr-08	149	5073.44	101357.07	101197.20	101154.73	102769.22	104689.48	105516.99	104990.56	294.85	294.92	295.18	298.59	298.92	299.35
17-Apr-08	150	5061.80	101357.07	101202.71	101165.68	102769.45	104694.95	105490.43	104963.12	294.94	295.02	295.20	298.67	299.03	299.41
17-Apr-08	5000 - 3	5068.82	101357.07	101201.79	101162.03	102766.60	104719.58	105502.82	104975.93	294.85	294.91	295.17	298.57	298.91	299.32
17-Apr-08	151	5066.58	101357.07	101108.97	101056.23	101789.65	104963.07	105957.88	105446.11	294.88	294.82	295.11	298.69	299.35	300.54
17-Apr-08	152	5061.28	101357.07	101103.46	101056.23	101784.17	105012.31	105936.63	105451.60	294.84	294.80	295.10	298.69	299.30	300.49
17-Apr-08	153	5071.21	101357.07	101114.49	101050.75	101795.05	104974.01	105957.88	105473.55	294.90	294.87	295.12	298.77	299.44	300.67
17-Apr-08	154	5069.84	101357.07	101103.46	101056.23	101756.80	104919.29	105973.82	105517.46	294.96	294.91	295.19	298.79	299.47	300.69
17-Apr-08	155	5069.32	101357.07	101103.46	101050.75	101767.75	104952.12	105931.32	105495.51	294.95	294.93	295.20	298.75	299.40	300.61
17-Apr-08	5000 - 2 1/2	5067.65	101357.07	101106.77	101054.04	101778.68	104964.16	105951.51	105476.85	294.91	294.87	295.14	298.74	299.39	300.60
17-Apr-08	156	5047.49	101357.07	101048.32	100990.55	100967.73	104875.52	106053.50	105835.79	294.87	294.78	295.02	298.70	299.54	301.33
17-Apr-08	157	5049.87	101357.07	101037.29	101001.50	100956.76	104913.82	106106.62	105835.79	294.83	294.76	295.05	298.66	299.45	301.20
17-Apr-08	158	5041.04	101357.07	101042.81	100990.55	100945.79	104952.12	106127.86	105852.26	294.81	294.77	295.02	298.67	299.48	301.25
17-Apr-08	159	5061.97	101357.07	101031.78	100990.55	100956.76	104963.07	106111.93	105835.79	294.85	294.83	295.09	298.72	299.54	301.31
17-Apr-08	160	5047.66	101357.07	101042.81	101006.97	100973.21	104984.95	106138.49	105841.28	294.83	294.62	295.11	298.53	299.35	301.22
17-Apr-08	5000 - 2	5049.61	101357.07	101040.60	100996.03	100960.05	104937.90	106107.68	105840.18	294.84	294.75	295.06	298.66	299.47	301.26
17-Apr-08	161	5057.02	101357.07	100960.10	100886.57	99733.55	104891.93	106276.60	106324.27	294.42	293.80	294.92	297.71	298.80	301.48
17-Apr-08	162	5053.61	101357.07	100960.10	100892.05	99755.44	104963.07	106303.16	106351.71	294.35	293.45	294.95	297.61	298.66	301.34
17-Apr-08	163	5042.91	101357.07	100954.59	100897.52	99739.03	105012.31	106303.16	106340.74	294.27	293.75	294.96	297.84	298.79	301.40
17-Apr-08	164	5052.42	101357.07	100971.13	100897.52	99733.55	105001.37	106271.29	106335.25	294.32	293.96	294.91	297.95	298.96	301.39
17-Apr-08	165	5039.52	101357.07	100965.61	100897.52	99744.52	105012.31	106292.54	106357.20	294.27	293.96	294.87	297.98	298.99	301.39
17-Apr-08	5000 - 0	5049.10	101357.07	100962.31	100894.23	99741.22	104976.20	106289.35	106341.83	294.33	293.79	294.92	297.82	298.84	301.40
22-Apr-08	1	3008.80	101311.95	101174.12	101147.87	100763.50	102597.90	102948.46	102975.03	288.99	288.71	288.74	290.09	290.40	291.31
22-Apr-08	2	3012.24	101317.47	101174.12	101147.87	100758.01	102652.61	102969.71	102964.06	288.97	288.74	288.73	290.11	290.44	291.32
22-Apr-08	3	3010.67	101311.95	101179.63	101147.87	100763.50	102619.78	102964.40	102975.03	288.90	288.72	288.76	290.09	290.35	291.20
22-Apr-08	4	3013.15	101311.95	101174.12	101153.34	100768.98	102581.48	102990.96	103002.48	288.79	288.47	288.78	289.81	290.06	291.01
22-Apr-08	5	3009.34	101311.95	101174.12	101153.34	100768.98	102625.26	102985.64	102975.03	288.93	288.84	288.73	290.20	290.56	291.37
22-Apr-08	3000 - 0	3010.84	101313.05	101175.22	101150.06	100764.59	102615.41	102971.83	102978.33	288.92	288.69	288.75	290.06	290.36	291.24
22-Apr-08	6	5004.21	101317.47	100920.50	100857.83	99704.89	104983.47	106247.09	106311.93	288.37	288.11	288.55	291.78	292.81	295.28
22-Apr-08	7	5008.06	101317.47	100909.47	100846.89	99693.92	104879.51	106183.35	106235.09	288.46	288.26	288.56	292.00	293.09	295.47
22-Apr-08	8	5011.23	101311.95	100914.98	100857.83	99682.95	104961.58	106263.03	106295.47	288.64	288.56	288.61	292.26	293.35	295.63
22-Apr-08	9	4993.88	101306.42	100920.50	100852.36	99693.92	104967.06	106257.71	106289.98	288.71	288.29	288.58	291.81	292.94	295.58
22-Apr-08	10	5016.77	101311.95	100931.52	100852.36	99699.40	105016.30	106273.65	106300.95	288.60	287.96	288.57	291.83	292.86	295.51
22-Apr-08	5000 - 0	5006.83	101313.05	100919.39	100853.45	99695.02	104961.58	106244.96	106286.68	288.56	288.24	288.57	291.94	293.01	295.50

Table B.08 6D 4L Raw Data, Page 8

Date	Run	RPM	P_cell	Ps_in	Pt_in	Ps_out	Pt_A	Pt_B	Pt_C	Tt_10	Tt_12	Tt_2	Tt_A	Tt_B	Tt_C
22-Apr-08	15	4990.23	101311.95	101003.20	100945.39	100812.88	104835.74	106061.17	105889.33	288.15	287.59	288.46	291.53	292.42	294.45
22-Apr-08	16	4993.38	101317.47	101003.20	100934.45	100840.31	104813.85	106045.24	105889.33	288.76	288.54	288.58	292.29	293.18	294.99
22-Apr-08	17	4994.38	101311.95	100992.17	100950.86	100845.79	104802.91	106055.86	105861.88	289.14	289.12	288.76	292.79	293.69	295.40
22-Apr-08	18	5015.59	101311.95	100992.17	100945.39	100829.33	105010.83	106093.05	105922.26	288.62	287.94	288.69	291.62	292.42	294.45
22-Apr-08	19	5005.38	101317.47	100997.69	100950.86	100823.85	105043.66	106124.92	105922.26	288.05	287.51	288.57	291.42	292.05	293.97
22-Apr-08	5000 - 2.0	4999.79	101314.16	100997.69	100945.39	100830.43	104901.40	106076.05	105897.01	288.54	288.14	288.61	291.93	292.75	294.65
22-Apr-08	20	5021.80	101317.47	101058.34	101011.07	101711.55	104956.11	105949.63	105444.77	289.65	289.60	289.44	293.22	293.88	295.16
22-Apr-08	21	5016.26	101317.47	101069.36	101022.01	101749.86	104934.23	105939.00	105455.74	289.67	289.69	289.46	293.30	293.96	295.23
22-Apr-08	22	5016.77	101317.47	101058.34	101027.49	101717.02	104972.53	105928.38	105428.30	289.75	289.81	289.45	293.42	294.09	295.30
22-Apr-08	23	5019.12	101317.47	101069.36	101016.53	101727.97	104939.70	105960.25	105466.72	289.82	289.90	289.52	293.50	294.22	295.41
22-Apr-08	24	5029.72	101317.47	101069.36	101005.60	101706.08	104928.75	105923.07	105477.70	289.87	289.94	289.59	293.51	294.19	295.44
22-Apr-08	5000 - 2.5	5020.73	101317.47	101064.95	101016.54	101722.49	104946.26	105940.06	105454.65	289.75	289.79	289.49	293.39	294.07	295.31
22-Apr-08	1	5023.32	101306.42	100904.01	100841.48	99688.35	104945.32	106252.61	106294.72	290.50	290.56	290.15	294.19	295.34	297.64
22-Apr-08	2	5037.49	101306.42	100898.50	100852.43	99699.32	104989.10	106252.61	106300.21	290.54	290.66	290.22	294.25	295.38	297.62
22-Apr-08	3	5033.43	101306.42	100904.01	100852.43	99677.38	104923.43	106289.79	106322.16	290.56	290.54	290.33	294.24	295.35	297.63
22-Apr-08	4	5030.90	101300.90	100904.01	100836.01	99671.90	104934.38	106263.23	106355.08	290.53	290.44	290.26	294.02	295.10	297.54
22-Apr-08	5	5036.30	101306.42	100898.50	100830.54	99682.87	105021.93	106289.79	106322.16	289.98	289.63	289.98	293.13	294.27	296.85
22-Apr-08	5000 - 0	5032.29	101305.32	100901.81	100842.58	99683.96	104962.83	106269.61	106318.86	290.42	290.37	290.19	293.97	295.09	297.46
22-Apr-08	12	5032.42	101306.42	100992.22	100934.50	100955.47	104923.43	106040.13	105828.28	290.54	290.55	290.16	294.22	295.09	296.76
22-Apr-08	13	5022.31	101306.42	100992.22	100939.97	100977.42	104841.36	106061.37	105795.35	290.76	290.79	290.30	294.41	295.34	297.01
22-Apr-08	14	5014.25	101306.42	100997.73	100945.45	100955.47	104885.13	106082.62	105861.20	290.77	290.68	290.35	294.26	295.14	296.95
22-Apr-08	15	5019.96	101306.42	100992.22	100945.45	100960.96	104786.64	106061.37	105800.84	290.81	290.65	290.38	294.27	295.17	296.99
22-Apr-08	16	5019.79	101306.42	100992.22	100945.45	100971.93	104907.02	106045.44	105773.40	290.79	290.70	290.39	294.23	295.16	296.94
22-Apr-08	5000 - 2.0	5021.74	101306.42	100993.32	100942.16	100964.25	104868.72	106058.19	105811.81	290.73	290.67	290.31	294.28	295.18	296.93
22-Apr-08	17	5019.45	101306.42	101063.89	101016.58	101809.98	104824.94	105912.64	105416.71	290.15	289.85	289.69	293.46	294.22	295.57
22-Apr-08	18	5010.73	101311.95	101058.38	101022.05	101799.04	104901.55	105923.26	105405.74	290.15	289.97	289.75	293.59	294.29	295.55
22-Apr-08	19	5024.50	101306.42	101063.89	101016.58	101799.04	104814.00	105891.39	105400.25	290.26	289.97	289.80	293.64	294.37	295.63
22-Apr-08	20	5014.08	101306.42	101058.38	101016.58	101788.10	104841.36	105896.70	105416.71	290.29	290.05	289.83	293.65	294.34	295.65
22-Apr-08	21	5013.41	101300.90	101069.40	101016.58	101788.10	104841.36	105907.32	105389.27	290.04	289.69	289.87	293.49	294.14	295.47
22-Apr-08	5000 - 2.5	5016.43	101306.42	101062.79	101017.67	101796.85	104844.64	105906.26	105405.74	290.18	289.90	289.79	293.57	294.27	295.57
22-Apr-08	1	6017.36	101306.42	100744.14	100660.92	99030.11	106570.44	108685.54	108753.14	291.16	290.98	291.17	296.19	297.86	301.40
22-Apr-08	2	6022.56	101311.95	100738.63	100660.92	99013.65	106428.18	108542.12	108714.73	291.10	290.89	291.25	296.13	297.74	301.29
22-Apr-08	3	6016.27	101311.95	100744.14	100633.56	99013.65	106433.65	108483.68	108692.78	291.09	290.86	291.21	296.17	297.65	301.14
22-Apr-08	4	6020.50	101306.42	100738.63	100649.97	98991.71	106592.33	108573.99	108714.73	290.79	290.42	291.03	295.81	297.43	301.07
22-Apr-08	5	6015.67	101306.42	100738.63	100649.97	99030.11	106466.48	108595.24	108703.76	290.98	290.85	291.14	296.06	297.69	301.26
22-Apr-08	6000 - 0	6018.47	101308.63	100740.83	100651.07	99015.85	106498.22	108576.11	108715.83	291.02	290.80	291.16	296.07	297.68	301.23
22-Apr-08	7	6022.07	101306.42	100837.86	100759.41	100631.84	106395.35	108329.63	108028.79	291.00	290.80	291.08	295.90	297.20	300.05
22-Apr-08	8	6025.94	101306.42	100843.37	100770.35	100609.90	106400.82	108334.95	108061.71	290.89	290.64	290.99	295.91	297.20	299.96
22-Apr-08	9	6029.82	101311.95	100832.35	100775.82	100615.38	106455.54	108398.69	108089.15	290.94	290.75	291.11	295.89	297.21	300.05
22-Apr-08	10	6022.68	101311.95	100837.86	100775.82	100620.87	106532.14	108350.88	108111.10	290.75	290.46	290.98	295.65	296.93	299.88
22-Apr-08	11	6028.85	101306.42	100854.40	100764.88	100615.38	106482.89	108334.95	108078.18	291.01	290.78	291.02	295.90	297.23	300.08
22-Apr-08	6000 - 2	6025.87	101308.63	100841.17	100769.26	100618.67	106453.35	108349.82	108073.79	290.92	290.69	291.04	295.85	297.15	300.00
22-Apr-08	12	6029.94	101306.42	100931.58	100868.84	101919.42	106543.08	108048.09	107414.18	291.09	291.05	290.82	296.11	297.21	299.10
22-Apr-08	13	6024.01	101306.42	100948.12	100863.37	101935.83	106444.59	108079.97	107430.64	291.13	291.09	290.84	296.21	297.22	299.18
22-Apr-08	14	6026.06	101311.95	100931.58	100890.73	101930.36	106537.61	108191.52	107425.16	291.18	291.12	290.98	296.20	297.25	299.15
22-Apr-08	15	6029.94	101311.95	100937.09	100879.79	101930.36	106559.50	108058.72	107392.23	291.04	291.05	291.03	296.16	297.17	299.05
22-Apr-08	16	6029.33	101306.42	100931.58	100879.79	101924.89	106630.63	108106.53	107425.16	291.11	291.16	291.01	296.22	297.19	299.04
22-Apr-08	6000 - 2.5	6027.86	101308.63	100935.99	100876.50	101928.17	106543.08	108096.96	107417.47	291.11	291.09	290.94	296.18	297.21	299.10
22-Apr-08	17	6040.14	101306.42	101069.40	101038.46	103374.92	106274.97	107474.39	106695.31	291.70	291.79	291.59	296.66	297.28	297.99
22-Apr-08	18	6041.23	101306.42	101074.91	101038.46	103391.33	106253.08	107389.39	106728.24	291.73	291.85	291.60	296.68	297.32	298.05
22-Apr-08	19	6038.92	101311.95	101080.43	101032.99	103369.44	106296.85	107490.32	106689.82	291.73	291.92	291.61	296.75	297.33	298.00
22-Apr-08	20	6041.60	101306.42	101080.43	101027.52	103391.33	106247.61	107394.71	106766.65	291.76	291.96	291.64	296.69	297.32	298.06
22-Apr-08	21	6037.95	101306.42	101069.40	101027.52	103374.92	106110.81	107368.15	106651.41	291.74	291.84	291.66	296.67	297.22	298.03
22-Apr-08	6000 - 3	6039.97	101307.53	101074.91	101032.99	103380.39	106236.66	107423.39	106706.29	291.73	291.87	291.62	296.69	297.29	298.03
22-Apr-08	22	6026.67	101306.42	101135.56	101115.07	103747.00	105842.70	106805.07	106036.80	291.66	291.69	291.71	296.25	296.60	297.04
22-Apr-08	23	6028.97	101306.42	101146.58	101109.60	103741.53	105623.82	106550.09	106058.75	291.73	291.89	291.74	296.43	296.72	297.11
22-Apr-08	24	6044.76	101306.42	101146.58	101093.18	103757.94	105804.39	106783.82	106080.71	291.92	292.03	291.86	296.57	296.96	297.42
22-Apr-08	25	6041.60	101306.42	101135.56	101104.13	103763.41	105826.28	106831.63	106091.68	291.93	292.05	291.90	296.61	296.98	297.37
22-Apr-08	26	6054.77	101306.42	101141.07	101104.13	103763.41	105777.03	106762.57	106042.29	291.92	292.04	291.91	296.53	296.90	297.27
22-Apr-08	6000 - 3 1/3	6039.35	101306.42	101141.07	101105.22	103754.66	105774.84	106746.63	106062.05	291.83	291.94	291.82	296.48	296.83	297.24
22-Apr-08	27	6041.23	101311.95	101251.33	101240.92	103418.69	104305.12	104260.58	104165.55	291.96	292.02	292.03	296.68	297.04	297.63
22-Apr-08	28	6043.79	101306.42	101251.33	101235.45	103391.33	104310.59	104239.33	104154.57	291.96	292.01	292.01	296.74	297.10	297.72
22-Apr-08	29	6034.43	101306.42	101251.33	101235.45	103396.80	104272.29	104191.52	104110.67	292.00	292.00	292.03	296.74	297.14	297.72
22-Apr-08	30	6035.03	101306.42	101251.33	101229.97	103402.28	104305.12	104265.89	104176.52	292.01	292.03	292.02	296.80	297.11	297.68
22-Apr-08	31	6050.37	101306.42	101256.84	101235.45	103418.69	104299.65	104239.33	104143.60	292.01	292.02	292.05	296.75	297.12	297.75
22-Apr-08	6000 - 3 2/3	6040.97	101307.53	101252.43	101235.45	103405.56	104298.56	104239.33	104150.18	291.99	292.02	292.03	296.74	297.10	297.70
22-Apr-08	32	6034.06	101306.42	101163.12	101136.96	103768.89	105448.73	106194.18	105767.91	291.64	291.69	291.76	296.11	296.34	296.85
22-Apr-08	33	6017.96	101306.42	101163.12	101136.96	103768.89	105432.31	106268.54	105724.01	291.71	291.78	291.75	296.14	296.42	296.91
22-Apr-08	34	6033.46	101306.42	101168.63	101136.96	103719.64	105399.48	106204.80	105680.11	291.80	291.89	291.82	296.24	296.53	297.00
22-Apr-08	35	6048.05	101306.42	101168.63	101131.48	103747.00	105503.44	106279.17	105718.53	291.82	291.93	291.79	296.25	296.51	297.05
22-Apr-08	36	6034.18	101300.90	101163.12	101136.96	103741.53	105448.73	106252.61	105658.16	291.75	291.82	291.76	296.16	296.42	296.88
22-Apr-08	6000 - 3 1/3	6033.54	101305.32	101165.33	101135.86	103749.19	105446.54	106239.86	105709.75	291.74	291.82	291.78	296.18	296.45	296.94
22-Apr-08	37	6028.61	101311.95	101085.94	101032.99	103424.16	106269.50	107362.83	106673.36	291.59	291.16	291.85	296.13	296.67	297.65
22-Apr-08	38	6028.24	101311.95	101080.43	101038.46	103456.99	106171.00	107267.22	106700.80	291.69	291.50	291.82	296.37	296.90	297.76
22-Apr-08	39	6026.79	101306.42	101085.94	101032.99	103440.58	106231.19	107330.96	106629.46	291.62	291.41	291.81	296.31	296.80	297.64
22-Apr-08	40	6021.35	101306.42	101085.94	101038.46	103424.16	106105.34	107320.34	106667.87	291.84	291.86	291.81	296.67	297.20	297.96
22-Apr-08	41	6018.93	101306.42	101085.94	101038.46	103418.69	106247.61	107315.03	106640.44	291.81	291.80	291.80	296.66	297.25	298.01
22-Apr-08	6000 - 3	6024.78	101308.63	101084.84	101036.28	103432.92	106204.93	107319.28	106662.39	291.71	291.55	291.82	296.43	296.96	297.80

Table B.09 6D 4L Raw Data, Page 9

Date	Run	RPM	P_cell	Ps_in	Pt_in	Ps_out	Pt_A	Pt_B	Pt_C	Tt_10	Tt_12	Tt_2	Tt_A	Tt_B	Tt_C
22-Apr-08	42	6035.64	101306.42	100942.60	100879.79	101903.00	106493.84	108101.21	107419.67	291.77	291.67	291.75	296.81	297.80	299.74
22-Apr-08	43	6029.45	101306.42	100942.60	100868.84	101919.42	106384.40	108058.72	107414.18	291.74	291.70	291.73	296.84	297.83	299.77
22-Apr-08	44	6029.58	101311.95	100931.58	100868.84	101886.59	106400.82	108069.34	107414.18	291.83	291.69	291.78	296.79	297.84	299.80
22-Apr-08	45	6030.79	101306.42	100937.09	100874.31	101903.00	106548.56	108058.72	107375.77	291.80	291.59	291.69	296.73	297.77	299.73
22-Apr-08	46	6040.02	101306.42	100942.60	100874.31	101908.48	106422.71	108090.59	107414.18	291.77	291.70	291.68	296.75	297.76	299.66
22-Apr-08	6000 - 2 1/2	6033.09	101307.53	100939.30	100873.22	101904.10	106450.06	108075.72	107407.60	291.78	291.67	291.73	296.78	297.80	299.74
22-Apr-08	47	6026.55	101311.95	100865.42	100775.82	100862.22	106515.73	108287.14	107919.04	291.96	291.57	292.04	296.85	298.07	300.81
22-Apr-08	48	6035.28	101311.95	100843.37	100781.29	100812.85	106471.95	108308.39	107984.89	292.01	291.77	292.02	296.99	298.22	301.03
22-Apr-08	49	6030.67	101306.42	100870.94	100792.24	100895.14	106548.56	108260.58	107930.01	291.99	291.80	292.04	297.04	298.31	300.96
22-Apr-08	50	6028.00	101311.95	100870.94	100803.18	100862.22	106461.01	108303.07	107902.57	291.93	291.64	292.03	296.83	298.12	300.86
22-Apr-08	51	6028.00	101306.42	100865.42	100797.71	100834.80	106422.71	108324.32	107919.04	291.89	291.75	292.02	296.97	298.14	300.80
22-Apr-08	6000 - 2	6029.70	101309.74	100863.22	100790.05	100853.45	106483.99	108296.70	107931.11	291.96	291.70	292.03	296.94	298.17	300.89
22-Apr-08	52	6043.79	101311.95	100722.09	100633.56	99024.62	106433.65	108558.05	108742.17	291.76	291.42	291.93	296.80	298.46	302.08
22-Apr-08	53	6054.28	101306.42	100733.11	100649.97	99013.65	106581.39	108648.36	108725.71	291.87	291.66	291.91	296.98	298.66	302.16
22-Apr-08	54	6047.69	101306.42	100722.09	100655.44	99013.65	106461.01	108573.99	108791.56	291.77	291.52	291.94	296.98	298.60	302.19
22-Apr-08	55	6044.40	101306.42	100733.11	100649.97	99008.17	106296.85	108526.18	108758.63	291.96	291.91	291.97	297.21	298.86	302.23
22-Apr-08	56	6046.71	101311.95	100749.65	100655.44	99013.65	106455.54	108685.54	108780.58	291.98	291.81	292.14	297.17	298.68	302.14
22-Apr-08	6000 - 0	6047.37	101308.63	100732.01	100648.88	99014.75	106445.69	108598.43	108759.73	291.87	291.66	291.98	297.03	298.65	302.16

Table B.10 6D 4L Raw Data, Page 10

APPENDIX C. CALCULATED DATA FOR 6 IN DIAMETER, 4 IN SPAN

The performance data for the 6D 4L CFF is shown below. The values were calculated by taking the raw data points, calculating the performance values and than taking an average for each data point. The error bands show the high value and low value for each averaged data point. The mass flow rate, power and thrust were normalized for a 1 m unit length by taking the value and multiplying by 1 m and dividing by the 4 in span.

Avg Calc Data									Error Band (High and Low Values for each data point)							
	Data Row	RPM	mdot/1m [(kg/s)/1m]	efficiency	Pt_ratio	Tt_ratio	Thrust/1m [N/1m]	Power/1m [Watts/1m]	eff "+"	eff "-"	Pt_ratio "+"	Pt_ratio "-"	Tt_ratio "+"	Tt_ratio "-"	m_dot "+"	m_dot "-"
19-Mar-08	5000 - 0	5012	6.2919425	0.7729	1.0487	1.0178	539.4907	32337.049	0.0349	0.0542	0.0011	0.0035	0.0004	0.0005	0.056	0.0243
19-Mar-08	5000 - 1	5010	6.1861301	0.7766	1.0492	1.0179	529.3605	32004.592	0.0222	0.0159	0.0004	0.0002	0.0004	0.0004	0.041	0.0411
19-Mar-08	5000 - 2	5001	5.5901775	0.7803	1.0462	1.0167	466.047	27032.491	0.0102	0.0199	0.0001	0.0001	0.0004	0.0002	0.036	0.0549
19-Mar-08	5000 - 2 1/2	4998	4.8902943	0.8179	1.0431	1.0149	396.9141	21047.8	0.0108	0.0123	0.0002	0.0003	0.0003	0.0002	0.062	0.0947
19-Mar-08	5000 -3	4988	3.96032	0.8316	1.0386	1.0131	305.2832	15037.359	0.0187	0.0111	0.0004	0.0002	0.0001	0.0002	0.022	0.109
19-Mar-08	5000 -3 1/3	4994	3.2775778	0.8227	1.0328	1.0113	234.2143	10706.367	0.0086	0.0130	0.0001	0.0001	0.0002	0.0002	0.078	0.079
19-Mar-08	5000 -3 2/3	5004	1.8367319	0.4407	1.0199	1.0129	104.0636	6837.5687	0.0046	0.0041	0.0002	0.0001	0.0001	0.0001	0.056	0.0856
19-Mar-08	5500 -0	5495	6.8848331	0.7820	1.0601	1.0216	649.1019	43013.49	0.0173	0.0176	0.0006	0.0003	0.0004	0.0005	0.037	0.0369
19-Mar-08	5500 -1	5503	6.7735062	0.7778	1.0598	1.0216	638.2754	42323.801	0.0074	0.0108	0.0004	0.0003	0.0003	0.0002	0.037	0.0375
19-Mar-08	5500 -2	5498	6.1170373	0.7767	1.0558	1.0202	560.2621	35800.796	0.0338	0.0157	0.0002	0.0001	0.0004	0.0008	0.069	0.0556
19-Mar-08	5500 -2 1/2	5497	5.4890963	0.8166	1.0529	1.0182	492.558	28989.66	0.0137	0.0101	0.0003	0.0002	0.0003	0.0003	0.046	0.0465
19-Mar-08	5500 - 3	5500	4.430568	0.8246	1.0473	1.0162	379.6273	20731.93	0.0081	0.0111	0.0006	0.0005	0.0001	0.0001	0.092	0.0814
19-Mar-08	5500 - 3	5503	4.3492244	0.8306	1.0468	1.0159	370.5123	20016.526	0.0112	0.0082	0.0003	0.0003	0.0001	0.0001	0.059	0.0591
19-Mar-08	5500 - 3 1/3	5481	3.604718	0.8062	1.0405	1.0142	286.4767	14833.082	0.0087	0.0052	0.0006	0.0005	0.0001	0.0001	0.042	0.0285
19-Mar-08	5500 - 3 2/3	5486	2.0973955	0.4395	1.0243	1.0157	131.1465	9542.9013	0.0055	0.0031	0.0002	0.0001	0.0001	0.0001	0.049	0.0746
19-Mar-08	6000 - 0	6007	7.2293202	0.7803	1.0732	1.0262	750.0036	54882.674	0.0124	0.0197	0.0005	0.0004	0.0005	0.0003	0.049	0.0562
19-Mar-08	6000 - 1	5995	7.0805232	0.7703	1.0721	1.0262	729.6481	53665.522	0.0197	0.0087	0.0007	0.0006	0.0003	0.0007	0.057	0.0864
19-Mar-08	6000 - 2	6009	6.4745367	0.7926	1.0681	1.0241	653.2936	45112.79	0.0197	0.0097	0.0008	0.0005	0.0003	0.0003	0.031	0.0868
19-Mar-08	6000 - 2 1/2	6008	5.7599569	0.7906	1.0638	1.0226	565.7014	37722.28	0.0026	0.0039	0.0002	0.0003	0.0001	0.0001	0.088	0.089
19-Mar-08	6000 - 3	5988	4.7331367	0.8214	1.0574	1.0196	445.304	26911.209	0.0188	0.0105	0.0003	0.0004	0.0001	0.0004	0.063	0.0451
19-Mar-08	6000 - 3 1/3	6007	3.9925351	0.8167	1.0511	1.0176	354.8987	20348.545	0.0167	0.0071	0.0007	0.0003	0.0001	0.0001	0.053	0.0107
19-Mar-08	6000 - 3 2/3	5998	2.2394499	0.4545	1.0294	1.0183	153.8189	11883.332	0.0022	0.0030	0.0004	0.0004	0.0002	0.0001	0.023	0.0935
17-Mar-08	3500 - 0	3490	4.3617485	0.6966	1.0239	1.0097	256.9813	12295.987	0.0191	0.0111	0.0003	0.0003	0.0001	0.0002	0.047	0.0708
17-Mar-08	3500 - 1	3499	4.2909621	0.7237	1.0237	1.0093	252.3455	11546.74	0.0111	0.0099	0.0002	0.0002	0.0001	0.0002	0.059	0.0599
17-Mar-08	3500 - 2	3500	3.7716427	0.7189	1.0220	1.0087	215.4901	9493.5126	0.0256	0.0233	0.0002	0.0003	0.0002	0.0002	0.014	0.0546
17-Mar-08	3500 - 2 1/2	3510	3.3095837	0.7142	1.0206	1.0082	184.7147	7852.2772	0.0087	0.0052	0.0001	0.0002	0.0001	0.0002	0.046	0.0311
17-Mar-08	3500 -3	3506	2.5802477	0.7055	1.0178	1.0072	135.567	5365.674	0.0119	0.0063	0.0002	0.0002	0.0001	0.0001	0	0
17-Mar-08	3500 -3 1/3	3496	1.861636	0.6016	1.0129	1.0061	83.73501	3286.1933	0.0137	0.0190	0.0001	0.0003	0.0001	0.0001	0.163	0.1135
17-Mar-08	3500 -3 2/3	3511	1.1485971	0.4294	1.0103	1.0068	46.66826	2271.567	0.0151	0.0088	0.0001	0.0000	0.0001	0.0002	0.091	0.142
17-Mar-08	4000 -0	3999	5.0145631	0.7483	1.0315	1.0120	339.4291	17352.681	0.0141	0.0113	0.0003	0.0002	0.0003	0.0002	0.041	0.0102
17-Mar-08	4000 -1	4006	4.9221044	0.7479	1.0307	1.0116	332.6369	16578.873	0.0209	0.0261	0.0002	0.0002	0.0003	0.0003	0.031	0.073
17-Mar-08	4000 -2	3994	4.3734999	0.7536	1.0288	1.0108	287.7268	13726.995	0.0236	0.0165	0.0002	0.0002	0.0002	0.0004	0.035	0.0234
17-Mar-08	4000 -2 1/2	3994	3.8653312	0.7657	1.0275	1.0102	248.1814	11394.436	0.0232	0.0182	0.0002	0.0002	0.0002	0.0003	0.053	0.0133
17-Mar-08	4000 - 3	3999	2.8958155	0.7759	1.0238	1.0087	175.2981	7313.0856	0.0245	0.0184	0.0001	0.0002	0.0002	0.0003	0.055	0.2205
17-Mar-08	4000 - 3 1/3	4002	2.1639605	0.7294	1.0202	1.0079	121.819	4950.6332	0.0205	0.0220	0.0002	0.0003	0.0001	0.0002	0.315	0.1466
17-Mar-08	4000 - 3 2/3	4003	1.5320952	0.4385	1.0134	1.0087	71.01995	3871.2983	0.0044	0.0086	0.0001	0.0001	0.0001	0.0001	0.068	0.1039
17-Mar-08	4500 - 0	4499	5.6270133	0.7505	1.0393	1.0148	429.2389	24103.357	0.0161	0.0255	0.0002	0.0003	0.0004	0.0002	0.045	0.0454
17-Mar-08	4500 - 1	4497	5.5450542	0.7461	1.0390	1.0148	422.3073	23726.163	0.0120	0.0113	0.0002	0.0002	0.0001	0.0003	0.037	0.0092
17-Mar-08	4500 - 2	4495	4.9012965	0.7604	1.0363	1.0135	362.7374	19196.793	0.0242	0.0188	0.0003	0.0001	0.0003	0.0003	0.052	0.0523
17-Mar-08	4500 - 2 1/2	4499	4.2789591	0.7517	1.0347	1.0131	311.4545	16193.994	0.0099	0.0100	0.0002	0.0003	0.0001	0.0002	0.071	0.048
17-Mar-08	4500 - 3	4497	3.4293297	0.8036	1.0312	1.0110	237.8493	10942.338	0.0077	0.0080	0.0002	0.0002	0.0000	0.0000	0.147	0.1523
17-Mar-08	4500 - 3 1/3	4509	2.7677946	0.8044	1.0270	1.0096	179.5265	7650.1297	0.0568	0.0233	0.0004	0.0003	0.0003	0.0005	0.268	0.0939
17-Mar-08	4500 - 3 2/3	4512	1.3348583	0.4836	1.0172	1.0101	69.91064	3910.6975	0.0211	0.0192	0.0002	0.0002	0.0003	0.0004	0.096	0.0994
17-Mar-08	5000 - 0	4994	6.2842808	0.7546	1.0492	1.0184	536.4959	33427.409	0.0140	0.0088	0.0001	0.0001	0.0002	0.0004	0.065	0.0569
17-Mar-08	5000 - 1	4996	6.1619249	0.7563	1.0490	1.0183	525.9624	32580.143	0.0073	0.0110	0.0003	0.0004	0.0002	0.0002	0.066	0.0165
17-Mar-08	5000 - 2	5007	5.5358915	0.7573	1.0462	1.0172	461.6218	27587.128	0.0177	0.0129	0.0003	0.0002	0.0003	0.0004	0.046	0.0462
12-Mar-08	1000 - 0	1005	1.0118117	0.3025	1.0017	1.0016	15.85272	460.86887	0.0269	0.0269	0.0000	0.0000	0.0002	0.0001	0	0
12-Mar-08	1500 - 0	1495	1.6001402	0.4612	1.0039	1.0024	38.19821	1117.7488	0.0372	0.0275	0.0000	0.0000	0.0002	0.0002	0	0
12-Mar-08	2000 - 0	2001	2.3733147	0.4626	1.0073	1.0045	77.22512	3094.4395	0.0060	0.0088	0.0000	0.0001	0.0000	0.0000	6E-05	9E-05
12-Mar-08	2000 - 1	2004	2.3068934	0.4767	1.0073	1.0044	75.22993	2912.739	0.0397	0.0344	0.0001	0.0001	0.0003	0.0003	0.066	0.0449
12-Mar-08	2000 - 2	2002	2.0701387	0.5423	1.0068	1.0036	65.84578	2142.6979	0.0189	0.0163	0.0001	0.0001	0.0001	0.0001	0.193	0.1809
12-Mar-08	2000 - 2.5	2021	1.6612089	0.6006	1.0064	1.0031	51.96399	1471.4056	0.0731	0.0340	0.0001	0.0001	0.0002	0.0004	0.092	0.0628
12-Mar-08	2000 - 3	2002	1.2777191	0.5400	1.0055	1.0029	37.41967	1074.0441	0.0278	0.0163	0.0001	0.0001	0.0001	0.0002	0.153	0.0407
12-Mar-08	3000 - 0	2993	3.6233396	0.6823	1.0172	1.0072	182.0495	7558.6402	0.0245	0.0254	0.0001	0.0001	0.0002	0.0002	0.024	0.0473
12-Mar-08	3000 - 1	3006	3.5617669	0.6638	1.0172	1.0074	178.6538	7597.4073	0.0290	0.0292	0.0001	0.0001	0.0003	0.0003	0.014	0.0579
12-Mar-08	3000 - 2	2999	3.1828432	0.7430	1.0160	1.0061	155.0798	5666.5398	0.0650	0.0574	0.0000	0.0000	0.0005	0.0005	0.016	0.0649
12-Mar-08	3000-2 1/2	2992	2.7331242	0.6280	1.0148	1.0067	129.6409	5318.0841	0.0111	0.0137	0.0000	0.0001	0.0002	0.0001	0.038	0.0568
12-Mar-08	3000-3	2999	2.0709818	0.6452	1.0128	1.0057	92.46085	3388.2838	0.0181	0.0159	0.0000	0.0000	0.0001	0.0002	0.075	0.1809

Table C.01 6D 4L Averaged Calculated Data, Page 1

Avg Calc Data									Error Band (High and Low Values for each data point)							
			mdot/1m				Thrust/1m	Power/1m	eff	eff	Pt_ratio	Pt_ratio	Tt_ratio	Tt_ratio	m_dot	m_dot
	Data Row	RPM	[(kg/s)/1m]	efficiency	Pt_ratio	Tt_ratio	[N/1m]	[Watts/1m]	"+"	"-"	"+"	"-"	"+"	"-"	"+"	"-"
12-Mar-08	3000-3 1/3	2993	1.3874524	0.5217	1.0091	1.0050	52.60965	1995.4464	0.0181	0.0165	0.0001	0.0001	0.0001	0.0001	0.212	0.1559
12-Mar-08	3000-3 2/3	3001	0.8327611	0.3633	1.0073	1.0058	28.62142	1390.837	0.0029	0.0056	0.0001	0.0001	0.0000	0.0001	0.179	0.1317
12-Mar-08	3500-0	3502	4.2900655	0.7285	1.0237	1.0093	252.226	11508.899	0.0330	0.0248	0.0002	0.0002	0.0003	0.0004	0.059	0.0599
12-Mar-08	3500-1	3504	4.2301943	0.7408	1.0237	1.0091	249.3361	11164.725	0.0316	0.0377	0.0002	0.0001	0.0005	0.0004	0.06	0.0608
12-Mar-08	3500-2	3518	3.7841212	0.7607	1.0222	1.0084	217.6729	9161.6235	0.1372	0.0540	0.0001	0.0001	0.0005	0.0013	0.067	0.0681
12-Mar-08	3500-2 1/2	3504	3.2306135	0.6784	1.0205	1.0086	180.2443	8034.0685	0.0085	0.0086	0.0001	0.0002	0.0001	0.0002	0.047	0.0318
12-Mar-08	3500-3	3513	2.5794876	0.7390	1.0183	1.0071	137.3501	5274.327	0.0330	0.0232	0.0001	0.0000	0.0002	0.0003	1E-04	2E-05
12-Mar-08	3500-3 1/3	3505	1.8084911	0.5976	1.0128	1.0061	81.42053	3207.7055	0.0016	0.0036	0.0001	0.0001	0.0001	0.0001	0.084	0.0575
12-Mar-08	3500-3 2/3	3497	0.8919943	0.3850	1.0099	1.0073	35.68277	1893.2442	0.0124	0.0074	0.0001	0.0001	0.0001	0.0001	0.119	0.1901
25-Feb-08	1000	1002	0.7141203	0.4330	1.0013	1.0009	9.960089	181.34932	0.0431	0.0593	0.0001	0.0000	0.0001	0.0001	4E-04	0.0003
25-Feb-08	1500	1503	1.390569	0.3496	1.0032	1.0026	30.37245	1062.9786	0.0335	0.0346	0.0001	0.0000	0.0003	0.0003	0.038	0.1555
25-Feb-08	2000	2000	1.9420724	0.4908	1.0059	1.0034	57.44147	1926.3435	0.0485	0.0359	0.0000	0.0000	0.0003	0.0003	0.078	0.0532
25-Feb-08	2500	2501	2.492762	0.5395	1.0095	1.0051	94.06379	3653.298	0.0618	0.0514	0.0001	0.0001	0.0005	0.0006	0.18	0.1259
25-Feb-08	3000	3007	2.943999	0.6078	1.0141	1.0066	135.6936	5631.8561	0.0148	0.0134	0.0001	0.0001	0.0002	0.0002	0.086	0.0879
25-Feb-08	3500	3497	3.526512	0.6382	1.0195	1.0087	191.2401	8875.4026	0.0349	0.0140	0.0001	0.0001	0.0002	0.0004	0.044	0.1026
17-Apr-08	3000 - 0	3002	3.6393389	0.7157	1.0169	1.0067	182.3619	7107.0049	0.0163	0.0065	0.0001	0.0001	0.0001	0.0002	0.084	0.0568
17-Apr-08	3000 - 2	3007	3.1239726	0.7114	1.0157	1.0063	152.2558	5693.7939	0.0154	0.0181	0.0001	0.0001	0.0001	0.0001	5E-05	4E-05
17-Apr-08	3000 - 2.5	2991	2.6428785	0.7241	1.0145	1.0057	124.7764	4383.7619	0.0098	0.0093	0.0001	0.0001	0.0001	0.0001	0.039	0.059
17-Apr-08	3000 - 3	3005	2.12573	0.6867	1.0129	1.0054	95.64818	3308.1357	0.0052	0.0078	0.0001	0.0002	0.0000	0.0001	0.025	0.0991
17-Apr-08	3000 - 3 1/3	2998	1.5688122	0.5389	1.0091	1.0049	59.68236	2202.7923	0.0064	0.0077	0.0001	0.0001	0.0001	0.0000	0.034	0.1369
17-Apr-08	3000 - 3 2/3	2992	1.0590665	0.4010	1.0073	1.0052	36.1531	1586.8224	0.0110	0.0078	0.0001	0.0001	0.0001	0.0001	0.182	0.0499
17-Apr-08	3000 - 3 1/3	3005	1.5688122	0.5809	1.0098	1.0048	61.67525	2180.4541	0.0074	0.0061	0.0001	0.0001	0.0000	0.0001	0.034	0.1369
17-Apr-08	3000 - 3	3002	2.1503693	0.7144	1.0129	1.0051	96.473	3197.2553	0.0087	0.0131	0.0001	0.0001	0.0001	0.0001	0	0
17-Apr-08	3000 - 2 1/2	3002	2.7006326	0.7484	1.0147	1.0056	128.2982	4385.5703	0.0117	0.0128	0.0001	0.0000	0.0001	0.0001	0.075	0.0191
17-Apr-08	3000 - 2	2996	3.0906114	0.7077	1.0156	1.0063	150.1654	5632.7043	0.0238	0.0221	0.0000	0.0000	0.0002	0.0002	0.033	0.0502
17-Apr-08	3000 - 0	2998	3.5970031	0.7059	1.0168	1.0068	179.4355	7053.4024	0.0224	0.0315	0.0001	0.0001	0.0003	0.0002	0.057	0.0143
17-Apr-08	4000 - 0	3997	4.8040179	0.7372	1.0309	1.0119	324.9205	16524.901	0.0105	0.0078	0.0003	0.0002	0.0001	0.0001	0.053	0.0536
17-Apr-08	4000 - 2	4002	4.3336732	0.7486	1.0288	1.0109	285.1903	13682.103	0.0274	0.0098	0.0003	0.0003	0.0002	0.0005	0.082	0.0956
17-Apr-08	4000 - 2 1/2	4000	3.7507882	0.7486	1.0268	1.0102	240.0933	11026.101	0.0080	0.0074	0.0001	0.0001	0.0001	0.0001	0.041	0.0275
17-Apr-08	4000 - 3	3993	2.9547503	0.7671	1.0242	1.0090	181.7724	7681.6431	0.0061	0.0088	0.0002	0.0002	0.0000	0.0000	0.086	0.0882
17-Apr-08	4000 - 3 1/3	3999	2.5837422	0.7567	1.0212	1.0080	149.2408	5968.5734	0.0228	0.0197	0.0004	0.0004	0.0001	0.0002	0.098	0.1014
17-Apr-08	4000 - 3 2/3	4009	1.3565159	0.4397	1.0133	1.0086	62.67607	3377.2481	0.0024	0.0051	0.0001	0.0002	0.0001	0.0001	0.077	0.1188
17-Apr-08	4000 - 3 1/3	3998	2.3976136	0.7294	1.0201	1.0078	134.9735	5435.9802	0.0160	0.0206	0.0003	0.0003	0.0001	0.0001	0.086	0.1322
17-Apr-08	4000 - 3	3989	2.9542356	0.7612	1.0241	1.0090	181.4666	7710.6562	0.0037	0.0045	0.0001	0.0001	0.0001	0.0001	0.087	0.0882
17-Apr-08	4000 - 2 1/2	4007	3.7639342	0.7507	1.0270	1.0102	241.8902	11137.056	0.0033	0.0047	0.0002	0.0002	0.0001	0.0001	0.095	0.1106
17-Apr-08	4000 - 2	3998	4.2259611	0.7419	1.0285	1.0109	276.8194	13344.736	0.0113	0.0205	0.0001	0.0003	0.0002	0.0001	0.073	0.1106
17-Apr-08	4000 - 0	4001	4.878554	0.7347	1.0308	1.0119	329.3884	16779.78	0.0123	0.0104	0.0002	0.0002	0.0001	0.0002	0.031	0.021
17-Apr-08	5000 - 0	5011	6.1311853	0.7559	1.0494	1.0184	523.4053	32690.146	0.0095	0.0086	0.0006	0.0003	0.0001	0.0002	0.025	0.0585
17-Apr-08	5000 - 2	4994	5.4053664	0.7555	1.0458	1.0171	448.3773	26765.659	0.0058	0.0028	0.0004	0.0002	0.0001	0.0001	0.094	0.0475
17-Apr-08	5000 - 2 1/2	5007	4.7937057	0.7813	1.0435	1.0157	390.0063	21799.821	0.0087	0.0025	0.0002	0.0003	0.0001	0.0001	0.064	0.0429
17-Apr-08	5000 - 3	5004	3.7641958	0.8051	1.0384	1.0135	290.7494	14696.657	0.0061	0.0098	0.0001	0.0001	0.0001	0.0001	0.095	0.0411
17-Apr-08	5000 - 3 1/3	4994	3.0741284	0.7692	1.0325	1.0120	219.6971	10672.981	0.0221	0.0148	0.0002	0.0004	0.0002	0.0003	0.05	0.0336
17-Apr-08	5000 - 3 2/3	5009	1.8260292	0.4339	1.0201	1.0132	104.1481	6985.9259	0.0038	0.0054	0.0003	0.0002	0.0001	0.0001	0.07	0.0717
17-Apr-08	5000 - 3 1/3	4989	2.7559586	0.6714	1.0273	1.0116	181.2444	9220.0608	0.0113	0.0133	0.0005	0.0004	0.0001	0.0000	0.111	0.0755
17-Apr-08	5000 - 3	5010	3.8028318	0.8084	1.0385	1.0135	293.9843	14821.372	0.0060	0.0095	0.0002	0.0004	0.0001	0.0001	0.056	0.0113
17-Apr-08	5000 - 2 1/2	5009	4.8256783	0.7792	1.0435	1.0158	392.4765	22021.759	0.0072	0.0082	0.0001	0.0001	0.0002	0.0001	0.032	0.0748
17-Apr-08	5000 - 2	4992	5.4242529	0.7635	1.0458	1.0169	450.4359	26589.941	0.0122	0.0135	0.0002	0.0003	0.0002	0.0002	0.075	0.0663
17-Apr-08	5000 - 0	4996	6.0557898	0.7983	1.0494	1.0174	517.4057	30571.353	0.0081	0.0083	0.0001	0.0003	0.0002	0.0002	0.059	0.0678
22-Apr-08	3000 - 0	3008	3.5837076	0.7696	1.0169	1.0063	179.5439	6492.8852	0.0671	0.0423	0.0001	0.0001	0.0004	0.0005	0.071	0.0723
22-Apr-08	5000 - 0	5004	6.048381	0.7812	1.0494	1.0178	517.1973	31230.6	0.0163	0.0187	0.0003	0.0006	0.0004	0.0003	0.109	0.1021
22-Apr-08	5000 - 2.0	4997	5.4255308	0.7926	1.0464	1.0165	452.7756	25970.687	0.0522	0.0508	0.0006	0.0005	0.0009	0.0009	0.028	0.0663
22-Apr-08	5000 - 2.5	5007	4.8478301	0.7737	1.0437	1.0160	395.4155	22389.121	0.0102	0.0066	0.0001	0.0002	0.0002	0.0002	0.063	0.0424
22-Apr-08	5000 - 0	5013	6.1238903	0.7694	1.0498	1.0182	525.3816	32326.513	0.0482	0.0226	0.0004	0.0002	0.0005	0.0010	0.033	0.0501
22-Apr-08	5000 - 2.0	5001	5.3969825	0.7574	1.0459	1.0171	448.5048	26726.501	0.0098	0.0138	0.0003	0.0003	0.0003	0.0003	0.009	0.038
22-Apr-08	5000 - 2.5	5001	4.7620557	0.7735	1.0431	1.0157	386.1821	21702.577	0.0038	0.0067	0.0002	0.0001	0.0001	0.0001	0.096	0.1197
22-Apr-08	6000 - 0	5989	7.2579861	0.7854	1.0726	1.0258	750.1318	54260.357	0.0031	0.0028	0.0006	0.0004	0.0001	0.0002	0.035	0.0351
22-Apr-08	6000 - 2	5998	6.5887629	0.8001	1.0681	1.0238	664.2151	45443.111	0.0066	0.0101	0.0003	0.0003	0.0002	0.0001	0.085	0.1091
22-Apr-08	6000 - 2.5	5998	5.8856552	0.8008	1.0640	1.0224	579.4754	38199.833	0.0117	0.0110	0.0003	0.0002	0.0003	0.0002	0.061	0.1138
22-Apr-08	6000 - 3	6003	4.6536708	0.8290	1.0568	1.0193	436.4318	25958.052	0.0063	0.0056	0.0003	0.0007	0.0001	0.0001	0.044	0.0665
22-Apr-08	6000 - 3 1/3	6001	3.9247464	0.8264	1.0502	1.0171	347.9557	19457.872	0.0106	0.0161	0.0006	0.0012	0.0002	0.0002	0.065	0.0659
22-Apr-08	6000 - 3 2/3	6001	2.2659783	0.4743	1.0296	1.0177	156.4625	11604.831	0.0068	0.0070	0.0002	0.0004	0.0001	0.0002	0.112	0.1164
22-Apr-08	6000 - 3 1/3	5996	3.6119837	0.7967	1.0460	1.0163	307.2891	17039.914	0.0037	0.0087	0.0004	0.0004	0.0001	0.0001	0.043	0.0286
22-Apr-08	6000 - 3	5988	4.5647545	0.8531	1.0562	1.0185	425.6465	24481.11	0.0192	0.0185	0.0004	0.0003	0.0004	0.0003	0.078	0.0338
22-Apr-08	6000 - 2 1/2	5996	5.8509523	0.8060	1.0637	1.0222	574.2591	37529.768	0.0051	0.0079	0.0002	0.0002	0.0002	0.0001	0.095	0.035
22-Apr-08	6000 - 2	5991	6.4399316	0.7972	1.0673	1.0236	646.0654	44052.381	0.0081	0.0055	0.0003	0.0003	0.0002	0.0002	0.157	0.0796
22-Apr-08	6000 - 0	6009	7.3135795	0.7768	1.0727	1.0262	756.4862	55369.435	0.0129	0.0114	0.0004	0.0007	0.0003	0.0003	0.083	0.091

Table C.02 6D 4L Averaged Calculated Data, Page 2

APPENDIX D. CALCULATED DATA FOR 6 IN DIAMETER, 6 IN SPAN AND 6 IN DIAMETER, 1.5 IN SPAN

The calculated performance data for the 6D 6L [9] and 6D 1.5L [1] CFFs are reprinted from the corresponding references. The mass flow rate, thrust and power have been normalized to a 1 m length by multiplying by 1 m and dividing by corresponding span (6 in or 1.5 in).

Data Row	RPM	mdot/1m [(kg/s)/1m]	efficiency	Pt_ratio	Tt_ratio	Thrust/1m [N/1m]	Power/1m [Watts/1m]
6D 6L 3000 RPM							
12	3000	1.906391	0.703555	1.012058	1.004962	52.13357	2767.4047
5	3000	1.700369	0.7002455	1.010783	1.004461	48.82113	2226.6019
7	3000	1.660216	0.7902854	1.01073	1.003933	47.54009	1912.5929
18	3000	3.570775	0.7376474	1.015502	1.006078	162.4031	6329.1368
19	3000	3.485858	0.6879789	1.015562	1.006541	158.8973	6664.1142
29	3000	3.258001	0.6680843	1.015133	1.006551	146.5364	6226.4101
20	3000	3.225908	0.6993542	1.015364	1.006354	147.4646	5998.5633
30	3000	3.044667	0.7076869	1.015022	1.00614	137.32	5458.4155
21	3000	2.409968	0.7010001	1.013994	1.005776	108.3751	4078.3966
31	3000	2.318419	0.7402267	1.013932	1.005446	104.3064	3686.3518
32	3000	2.035976	0.7374677	1.012286	1.004823	86.61826	2860.3049
22	3000	1.623711	0.6916964	1.012692	1.005312	70.85707	2530.3188
23	3000	1.324293	0.5466198	1.00856	1.00454	48.85444	1750.1819
33	3000	1.240561	0.5305492	1.007039	1.003848	41.22344	1394.4681
6D 6L 4000 RPM							
47	4000	2.563781	0.7984133	1.022062	1.007973	148.3014	5993.3872
9	4000	2.293226	0.7550566	1.020001	1.007648	90.5905	5162.6549
24	4000	4.751761	0.6890953	1.028777	1.012021	295.9089	16687.575
34	4000	4.709911	0.6921016	1.028207	1.011734	288.3751	16150.551
44	4000	4.588354	0.7229567	1.027497	1.010953	278.3301	14629.394
35	4000	4.639705	0.6951428	1.027759	1.011499	282.2411	15601.785
25	4000	4.564075	0.6839986	1.028192	1.011867	282.9077	15869.619
45	4000	4.465814	0.7152107	1.02722	1.010961	271.5576	14306.868
26	4000	3.658996	0.7313489	1.02556	1.010072	222.3954	10810.034
46	4000	3.422547	0.7260237	1.024252	1.009631	203.286	9643.4856
36	4000	3.397059	0.7072742	1.02489	1.010144	203.3053	10044.107
27	4000	3.000618	0.7108612	1.023119	1.00938	177.0722	8246.2269
48	4000	2.653681	0.7719429	1.022492	1.008406	154.9531	6562.4933
37	4000	2.598283	0.763424	1.02204	1.00833	150.7837	6328.0601
49	4000	1.611699	0.5622865	1.014808	1.007618	78.7042	3600.9464
38	4000	1.130745	0.5877768	1.015736	1.007742	56.66486	2565.5656
6D 6L 4500 RPM							
28	4500	5.334667	0.7072127	1.035966	1.014603	370.5262	22626.003
39	4500	5.095763	0.6857645	1.035166	1.014729	349.7914	21890.581
40	4500	5.025579	0.6805206	1.034827	1.014701	345.1998	21544.369
50	4500	4.985155	0.7036883	1.034078	1.013915	340.8903	20267.434
51	4500	4.094688	0.7342788	1.03103	1.012155	275.4561	14574.526
41	4500	4.050409	0.6888052	1.032109	1.013403	275.8361	15844.103
42	4500	3.175578	0.7386122	1.028667	1.011173	208.8757	10367.959
52	4500	3.029285	0.7699989	1.02819	1.010541	198.203	9332.6241
53	4500	1.942128	0.5397944	1.016972	1.009088	100.9693	5181.0475
43	4500	1.478887	0.5242594	1.019532	1.010759	82.86877	4655.6543

Table D.01 6D 6L Calculated Data

RPM	mdot/1m [(kg/s)/1m	efficiency	Pt_ratio	Tt_ratio	Thrust/1m [N/1m]	Power/1m [Watts/1m]
6D 1.5L 3000 RPM						
3006	1.537802	0.5848948	1.01168	1.00577	66.11708	2556.3013
2991	1.669533	0.6013841	1.01161	1.00558	71.44092	2709.1609
3009	1.874685	0.6021956	1.01276	1.00611	83.63176	3288.4267
3016	1.900733	0.6081737	1.0131	1.00624	85.35102	3370.3349
3015	1.914807	0.5874442	1.01264	1.00621	85.10041	3396.8792
3010	1.998851	0.594922	1.01311	1.00636	89.9603	3634.2937
3007	2.039293	0.5879521	1.01356	1.00666	93.16221	3883.5973
3013	2.103922	0.6025083	1.01342	1.00644	95.52879	3856.0388
3006	2.286636	0.5867717	1.01378	1.00682	104.6914	4444.3725
3003	2.301046	0.6066486	1.01361	1.00651	105.1386	4278.0933
3001	2.334674	0.5951987	1.01365	1.00664	106.7923	4435.9504
3000	2.371104	0.5929596	1.01389	1.00681	108.8408	4618.1142
3005	2.389148	0.6135391	1.01401	1.00663	110.3906	4515.0063
3014	2.411808	0.585885	1.01386	1.00687	110.7111	4698.7644
3013	2.527677	0.6165998	1.01372	1.00647	115.6222	4630.8525
3023	2.52845	0.5831649	1.01413	1.00706	116.7486	5022.4036
2993	2.641867	0.5928494	1.01351	1.0066	120.5398	5018.1042
3017	2.652481	0.6143005	1.014	1.00666	121.6714	4977.4861
3003	2.655635	0.5603124	1.01361	1.00703	120.9695	5347.6428
3006	2.733007	0.7450189	1.01409	1.0056	126.2934	4290.3164
2999	2.769127	0.6117686	1.0138	1.00653	127.4595	5186.6674
3035	2.778362	0.5892818	1.01432	1.00708	128.9222	5489.4847
3003	2.77916	0.7032518	1.01403	1.00587	128.0378	4603.5434
3008	2.935176	0.6024951	1.01403	1.00681	134.7709	5663.5222
2982	2.979148	0.6815637	1.01385	1.00601	136.1559	5119.7635
3012	2.997557	0.5997028	1.01428	1.00699	138.9618	5908.2532
2988	3.008361	0.6332062	1.01399	1.00647	137.8732	5577.6193
3024	3.036668	0.6538616	1.01417	1.00639	139.7793	5400.0343
3013	3.077544	0.6267797	1.01422	1.00663	142.4911	5766.1292
3026	3.175555	0.6983892	1.01403	1.00596	145.3911	5239.2056
6D 1.5L 4000 RPM						
4022	2.548652	0.7026034	1.02209	1.00918	151.6848	6591.5196
4045	2.592231	0.6942351	1.02226	1.00936	155.0624	6761.6784
4019	3.041848	0.6791573	1.02356	1.01005	185.0763	8692.5751
4014	3.106583	0.6729717	1.02373	1.01022	189.6327	9042.5927
3999	3.209104	0.7024283	1.02429	1.00999	197.412	9202.0735
3985	3.302847	0.7048577	1.0244	1.00998	203.4024	9545.3694
4036	3.415721	0.6599408	1.02538	1.01116	212.809	10687.663
4005	3.52226	0.6547899	1.02489	1.01101	217.1061	11062.123
4013	3.648589	0.6736118	1.02572	1.01105	229.4625	11469.622
4014	3.713625	0.6794585	1.02557	1.0109	232.9227	11492.945
4027	3.770118	0.7002054	1.02641	1.01099	239.5258	11619.29
4016	3.770559	0.6807237	1.02647	1.01129	239.6354	12037.117
4001	3.794181	0.7224978	1.02635	1.0106	240.5538	11433.908
4004	3.825664	0.6782296	1.02665	1.0114	244.0386	12413.481
4022	3.828287	0.709245	1.02629	1.01082	241.8222	11627.501
3995	3.829865	0.6832144	1.02637	1.0112	243.0931	12258.638
4017	3.848594	0.6818477	1.02653	1.01131	244.9261	12293.738
4001	3.871636	0.7020389	1.0264	1.01093	245.1563	12045.087
4003	3.873185	0.6967671	1.02631	1.01096	245.383	12081.743
4010	3.903868	0.7917737	1.02612	1.00967	245.9182	10609.492
4004	3.936708	0.6730753	1.026	1.01129	246.7476	12577.221
4016	4.006852	0.6395855	1.02615	1.01194	251.9179	13472.866
3987	4.117456	0.6948263	1.02633	1.01106	259.9046	13007.254
4001	4.129907	0.6753378	1.02646	1.01143	261.6256	13403.046

RPM	mdot/1m [(kg/s)/1	efficiency	Pt_ratio	Tt_ratio	Thrust/1m [N/1m]	Power/1m [Watts/1m]
6D 1.5L 5000 RPM						
4998	2.97018	0.731104	1.03387	1.01337	219.04026	11445.914
4983	3.03264	0.730389	1.03383	1.01335	223.43337	11758.413
4992	3.81876	0.71623	1.03755	1.015	294.27575	16564.153
5007	3.88559	0.735082	1.03836	1.01495	302.1843	16677.649
5007	4.33669	0.707912	1.03953	1.01599	339.9235	19863.295
5007	4.33836	0.712201	1.03994	1.01607	341.92461	19954.082
4995	4.673	0.71073	1.04102	1.01662	371.33732	22253.264
5024	4.77756	0.712109	1.04113	1.01666	380.34331	22510.351
5017	4.9399	0.719844	1.04229	1.01705	395.4911	23781.958
5020	4.94924	0.682986	1.04228	1.01793	396.37424	25065.103
5029	4.99025	0.684045	1.04248	1.01801	401.13767	25266.59
5043	4.99953	0.687694	1.04291	1.01807	403.47103	25302.909
5004	5.10951	0.683779	1.04193	1.01779	405.73434	25800.748
5015	5.1243	0.712458	1.04237	1.01727	409.02318	24703.545
4994	5.15992	0.690645	1.04168	1.01745	411.72514	25726.249
5059	5.23906	0.717553	1.04336	1.01751	425.2065	25494.867
4995	5.28607	0.686736	1.04158	1.01752	421.25162	26442.434
5011	5.29921	0.731865	1.0423	1.01702	439.21616	25318.56
5040	5.32734	0.717999	1.04341	1.01773	447.67762	26301.137
6D 1.5L 6000 RPM						
6007	3.03267	0.725278	1.04543	1.01803	260.06166	15634.116
6005	3.11395	0.716851	1.04506	1.01808	265.78693	16122.894
6026	3.82205	0.736086	1.0504	1.01969	342.4692	21439.634
6008	3.94261	0.743254	1.05036	1.01948	353.1381	22018.358
6009	4.75729	0.743391	1.05739	1.02208	450.41294	30050.511
6006	4.80454	0.742265	1.0567	1.02183	452.05682	30048.428
5998	5.05187	0.724773	1.05787	1.02283	478.54912	33063.068
5995	5.1417	0.722623	1.05768	1.02283	485.82953	33694.735
5979	5.48677	0.723262	1.05947	1.02362	522.99461	37222.422
6023	5.52153	0.724152	1.06014	1.02385	529.61171	37289.494
6004	5.53798	0.732878	1.06088	1.02382	534.78917	37573.998
6044	5.5382	0.719206	1.06141	1.02447	537.38754	38124.53
6023	5.85013	0.721656	1.06228	1.02481	569.02173	40983.582
6039	5.89423	0.721419	1.06292	1.02505	576.18595	41490.586
6024	5.92637	0.720549	1.06277	1.02505	577.7673	41881.497
6010	5.95725	0.709129	1.06237	1.02529	579.03414	42717.93
6009	5.96492	0.709078	1.06209	1.02516	578.70202	42592.85
5993	5.97755	0.706341	1.06162	1.0251	578.08953	42768.754
6027	6.05333	0.704547	1.06313	1.02578	591.86895	44003.608
6002	6.06175	0.703979	1.06214	1.02549	585.87465	43824.005
5991	6.06951	0.713001	1.06269	1.02536	590.8987	43862.347
6036	6.08373	0.710923	1.06328	1.02562	595.11746	43789.086
5998	6.08391	0.735127	1.06216	1.02445	587.75414	42197.515
5977	6.11191	0.706573	1.06239	1.02542	593.67905	44522.991
6027	6.1502	0.703676	1.06294	1.02577	599.25318	44663.845
6035	6.26169	0.706787	1.06342	1.02587	612.09612	45494.429
6017	6.31309	0.71335	1.06372	1.02573	618.02467	45915.451

Table D.02 6D 1.5L Calculated Data

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